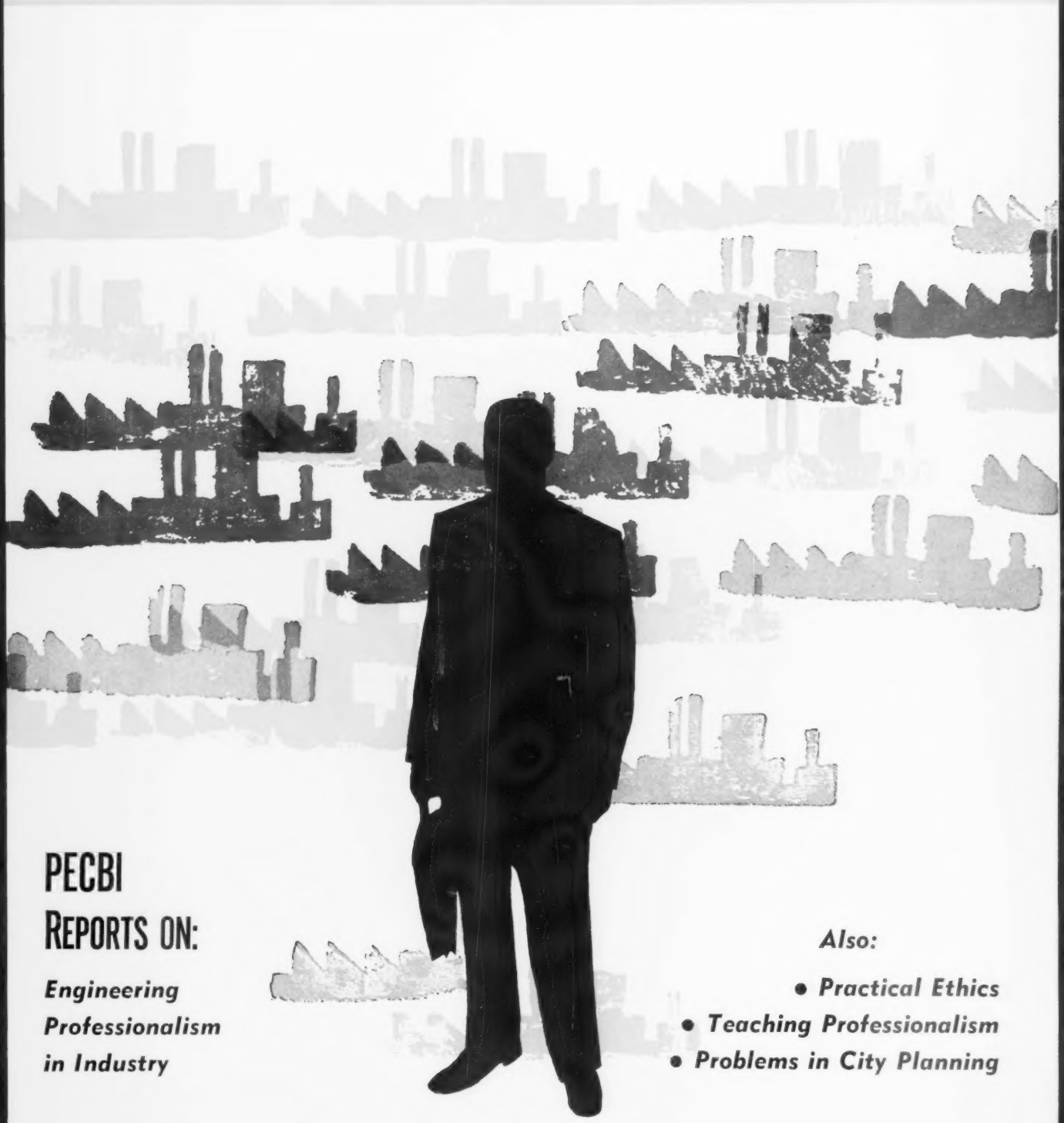
The Magazine of the Registered Professional Engineer

American Engineer

NOVEMBER 1960



PECBI REPORTS ON:

Engineering Professionalism in Industry

Also:

- *Practical Ethics*
- *Teaching Professionalism*
- *Problems in City Planning*

WE HAVE SOMETHING NEW, TOO, AND WE'RE AS PROUD AS PUNCH!

It's the establishment of a New York advertising office for the American Engineer magazine at 230 Park Avenue . . . Telephone MUrray Hill 6-8555. So for the first time in its history, the AE will have its own staff people soliciting advertising for the publication.

WE'D LIKE TO HAVE YOU MEET . . .

. . . Mr. Leonard Bleyer, Jr., the new Advertising Director for AE who will head up the New York operation. A graduate of Cornell University, Mr. Bleyer brings over fifteen years' experience in advertising selling to the magazine.

A PLANNED PROGRAM FOR PROGRESS . . .

This giant step forward is part of a well-planned program for progress blocked out three years ago by NSPE officials. Coupled with continued editorial expansion, the new, aggressive advertising solicitation effort will introduce the AE through personal contact to prospective advertisers throughout the United States.

KEEP US IN MIND . . .

The AE is the *only* professional engineering magazine. It is read by leaders—men dedicated to their profession. Advertising messages are not "lost" in the AE. Page rates are a real bargain. *Is your firm missing an excellent buy by not being in AE?*

TOP BUYERS!
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OVER 65,000 COPIES MONTHLY—
AMERICA'S FASTEST GROWING ENGINEERING MAGAZINE

Accept this silver-dollar paperweight FREE...

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The heavier your figurework load, the more productive hours you can save with a Marchant Deci • Magic—*the world's easiest-to-use desk calculator!*

Especially designed for engineering and construction figurework, the Deci • Magic performs lightning short cuts that bring new speed and ease to the most involved projections, forecastings or sizing calculations, with absolute assurance of right answers. Cost estimates, as well as stress, flow, heat-balance and all other complicated problems, are computed in far less time than with pencil, paper and slide rule, or with general-purpose calculating machines.

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Fine calculators and adding machines of advanced design

Letters to the Editor

Steinman Poems . . .

Dear Editor:

At the death of any famous and great man there are many eulogies written but I considered your eulogy to Dr. David B. Steinman one of the finest (September issue, AMERICAN ENGINEER).

I was somewhat disappointed that no one mentioned his book of poems, *I Built a Bridge and Other Poems*, written when he was past sixty. The public expects an engineer to express himself in his designs and buildings but become delighted when they can also be expressed in poetry.

A number of his poems appeared in various publications, among them the AE.

MARJORIE J. HARRISON
Butler, N.J.

Error Corrected . . .

Dear Editor:

Your recent item on Alexander Haring, on page 13 of the July issue, contained an error which I am sure you would wish to correct.

Professor Haring was not secretary of the Department of Public Works, of the City of New York, from 1940 until his death in March of this year. Upon checking our records I find that he was appointed as secretary, on April 10, 1939, and his appointment was terminated on December 31, 1939.

MEYER F. WILES, P.E.
Department of Public Works
New York, N.Y.

'Sound' Article . . .

Dear Editor:

Thank you for publishing "A Philosophy of Architecture" (AE, September). The thought seems sound and certainly was well developed. A maturing America will perhaps rediscover the value of Plato to an engineering education.

ERNEST A. CLARA, P.E.
Cincinnati, Ohio

Women Engineers . . .

Dear Editor:

I am surprised you would publish in AMERICAN ENGINEER, an article such as "Executives Balk at Hiring Women Engineers" which appears on page 8 of the September issue. Certainly the philosophies expressed do not coincide with those of the National Society of Professional Engineers. Certainly a society of professional engineers recognizes that the differences between men and women engineers do *not* require that women be supervised differently than are men. Certainly we don't believe that women develop less loyalty to a firm than do men. Certainly engineering has been professionalized enough that we realize that the problems involved in hiring a woman engineer or being hired as a woman engineer are due, not to the attitude of women, but rather to the attitude toward them. Certainly we do not advocate stagnating women engineers in nonsupervisory positions because a meritless survey indicates that most employees prefer to work for men. . . .

ELIZABETH J. MCLEAN, P.E., (MRS.)
Chicago, Ill.

More McCamy . . .

Dear Editor:

Quote from AMERICAN ENGINEER: "McCamy, who never claimed to be anything but a licensed professional engineer. . . ."

Gentlemen, it is indeed discouraging to find such a disgraceful statement in the AE. And yet it is very appropriate to the very deplorable and "unprofessional" attitude displayed by the Society of Architects. This dispute is nothing more than a jurisdictional one between two labor unions to control a given industrial operation.

If a civil engineer has the ability, skill and artistic flair to erect a piece of architecture to the satisfaction of his client, what right has any man to interfere. The building might come a little higher in price than if done by one in daily contact with the art. But that's a matter for the client to decide. Will anyone deny a civil engineer the ability to carry out the necessary structural analysis? Then indeed he would not be entitled to a license to begin with.

The basic characteristic of our country is said to be liberty. This means the liberty to choose one's work, to choose one's architect or civil engineer. While public safety demands some regulation to protect us from quacks, it appears that we have long ago reached the point where "licensing" has become a nuisance, in many instances a fraud, where it is no indication of ability but serves solely to create and maintain unearned vested interests in addition to an ever increasing staff of civil servants. Professional men should not talk about but live the life of a free society, less we too will assist to dig its grave.

In the case under consideration (McCamy) the architects were not on the ball and the squabble is mere hindsight. Any one of the architects was at liberty to compete, to submit a more pleasing design, a more practical design, a more economical building and "sell" it.

Let's face it, either we have a free competitive society or a police state. In the latter case it is just a question of time and degree.

HANS F. A. GOOTH, P.E.
King of Prussia, Pa.

New Jersey Fines . . .

Dear Editor:

The news article "New Jersey Board Imposes Fine for Illegal Practice" in the September issue of the AMERICAN ENGINEER makes reference to a penalty which was imposed on our company. May we attempt to complete the record and present the role which the technician plays in our operations.

The basis for the Board of Registration's penalty was apparently determined by review of a shop plan which had been prepared in our Kenilworth, New Jersey, office by a technician. The drawing illustrates the layout of automatic sprinklers, piping fittings, pipe hangers, etc. It was drawn from dimensions which were taken with simple tape and rule. A publication of the National Fire Protection Association and the National Board of Fire Underwriters was used like a handbook as a guide or set of "rules" for this layout. The plan was submitted to and approved by the Fire Insurance Rating Organization of New Jersey.

Penalty was levied by the State Board of Professional Engineers and Surveyors on May 27, 1960, "for violation of Statute 45:8." Our company was not invited to formal hearing although an investigator did call at our Kenilworth office and interviewed our personnel.

We are not at the moment so concerned about the legal technicalities of the Board's authority to impose penalties or the method of determining the facts in our particular case. We are, however, quite concerned with the academic question, "When does engineering work require the services and direction of a technician and when does it require the services and direction of a registered professional engineer?"

The nature of the work performed by our company in fabrication and installation of most fire protection systems requires the intelligence of a high school graduate with about two years experience. Technical training

(Continued on page 10)

American Engineer

NOVEMBER 1960
Vol. 30, No. 11

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS FOUNDED 1934

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Member, Business Publications Audit

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Professional News and Features

General News 12
Consulting 14
Education 16
Industry 18
Government 20
Society 42

Engineering Professionalism in Industry 23

The Engineer's Problems in City Planning 26
By J. F. C. Burdis, and Walter P. Mayfield Jr.

Practical Ethics for the Professional Engineer 31
By Stanley S. Paist Jr., P. E.

Teaching Professionalism 36
By Chester A. Peyronnin Jr., P. E.

The Engineer at Work

The Failing of the Malpasset Dam 34

Regular Departments

Letters 6
Meetings of Note 35
This Month 11
Strictly Business 47
From Washington 29
Professional Profiles 39
New Literature 40
Thoughts on Professionalism 44
Dates to Remember 20
Classified 51
With the Auxiliaries 52
Professional Directory 53
Advertisers' Index 60
Progress in Products 61

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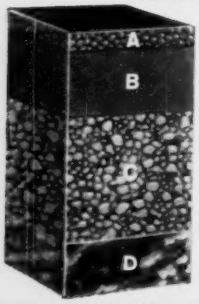
North Carolina Highway Engineers

STAGE CONSTRUCTION IN WIDTH—This new section of N. Carolina's Interstate 85 is a good example of *stage construction in width*. Two new lanes (left), built with DEEP STRENGTH Asphalt pavement, have been constructed alongside existing two lanes of Route 70 (right) to form a new section of this Interstate Highway. This combination of DEEP STRENGTH Asphalt pavement and *stage construction* is helping states to stretch construction dollars and still provide necessary highways quickly.

HERE IS **DEEP STRENGTH**
DESIGN ON I 85

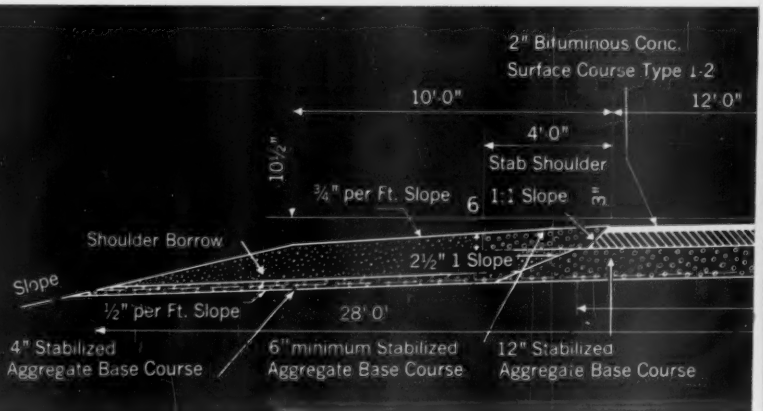


A
2-inch Asphalt concrete surface course

B
6-inch Asphalt concrete base course

C
12-inch Stabilized Aggregate Base Course

D
Subgrade



SOLVE TROUBLESOME SOIL AND DRAINAGE PROBLEM

Build North Carolina Interstate 85 with new DEEP STRENGTH Asphalt pavement

For new Guilford County section of Interstate No. 85, North Carolina Highway Engineers have chosen DEEP STRENGTH Asphalt pavement.

In Guilford County, engineers faced a difficult problem. The native soil in this area contains extensive strata of silty clay with high moisture content which could weaken the support of a finished road. To eliminate this threat to Interstate 85, the foundation was carefully proof-rolled with a 50-ton pneumatic tire roller to locate weak areas. These areas were then strengthened by replacing silty clay with suitable materials or installing necessary sub-drainage. It was only after this painstaking effort that actual construction of the pavement structure was begun.

In building this new part of Interstate 85, N. Carolina engineers followed several precepts of DEEP STRENGTH Asphalt pavement design. Notice in pictures and cross-section (below) the use of **6 inches of Asphalt base under 2 inches of Asphalt concrete surface course . . . Asphalt surface treated outside shoulder . . . depressed median for good drainage . . . heavy proof-rolling of the subgrade . . . and use of high-contact pressure pneumatic tire proof-roller on the aggregate base course.** Here is strength and durability!

When designed like this—for DEEP STRENGTH—Asphalt pavements *will carry the heaviest traffic loads without distress and with minimum maintenance.* Also, use of Asphalt pavement avoids high repair costs due to damaging action of de-icing salts experienced on other pavement type.

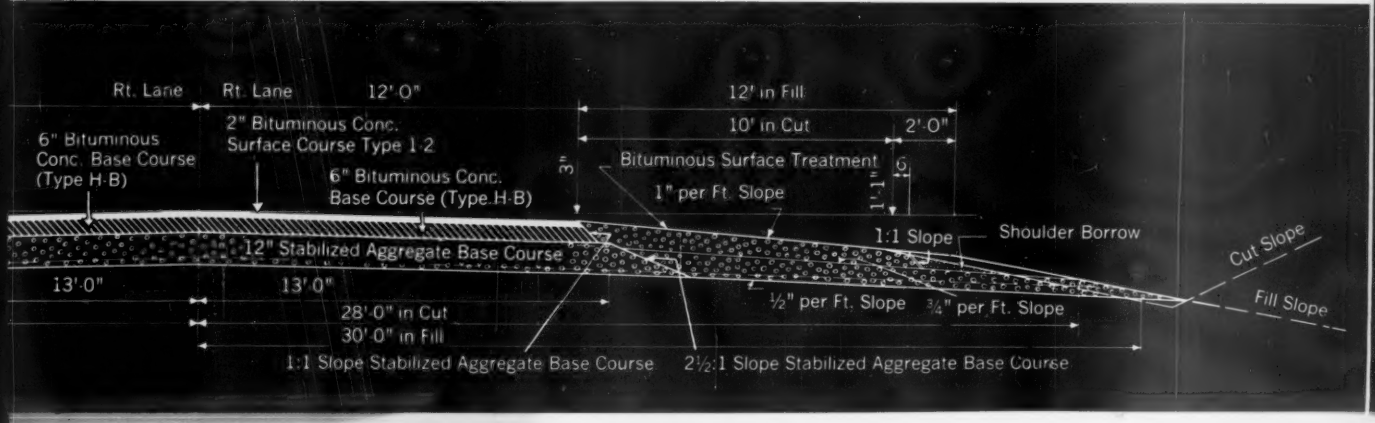
BEST USE OF ROAD FUNDS

State after state is finding that when Interstate Highways are built with Advanced Design DEEP STRENGTH Asphalt pavements, the optimum use is made of road building funds. That's because the Advanced Design Criteria permit inexpensive Asphalt base to be substituted, within limits, for more expensive Asphalt concrete surfacing. In addition, when Asphalt treated base is used in place of untreated base, reduction in total structure thickness may be allowed.

THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Maryland

Heavy compaction—This 50-ton rubber tire roller was used to proof-roll the subgrade. The aggregate base was proof-rolled with a 25-ton pneumatic tire roller exerting 82 psi contact pressure.

Outside Shoulders of stabilized aggregate base were Asphalt surface treated for width of 10 ft. One-half inch granite stone chips provide better traffic lane demarcation.



Aggregate Base Course / Aggregate Base Course / Aggregate Base Course

LETTERS

(Continued from page 6)

in draftsmanship, specialized training in the application of the insurance company's rule books, and the inculcation of a sense of responsibility is adequate, we feel, to accomplish efficiently and profitably an automatic sprinkler system installation. There are, obviously, some situations which are not covered by the "rules" and we must obtain clarification of correct practice from the insurance authority having jurisdiction or we must acquire professional consultation from one of our company's registered professional engineers or from an engineering firm which specializes in this area of practice.

We would suggest that draftsmanship does not necessarily require an engineering degree and that engineering drafting does not require the services nor the certification of a registered professional engineer. The acceptability of fabrication drawings should not be dependent on the seal of a registered professional engineer unless original, creative, and unique design has been presented.

We hope that many of your readers will agree with us and that others will express their opinions on "where the drawing requires the seal of a registered professional engineer."

Wayne E. Ault, P.E.
Manager, Engineering
"Automatic" Sprinkler Corporation of America,
Youngstown, Ohio

'Socialism' . . .

Dear Editor:

Congratulations to colleague Ratterman for speaking out in the September AE ("Letters to the Editor") against current overstress on highway construction. Surely the time has come for an honest evalulation of this vast and blatant socialism. And socialism it *is*—no different in concept or in consequence from the same evil practiced in other countries.

The cancer on a free enterprise economy that our highway financing methods constitute will not be cured until we place highway construction, maintenance, policing, and property costs firmly and squarely where they belong—on highway users. The current nonsense about the value of highways to "everyone," used by road interests as an effort to justify tax-support of their facilities, is vicious, collectivistic propaganda that selfish groups might just as well apply to the electric utilities, railroads, coal mines, steel mills and a host of other industries that are at least as important as expressways.

The immediate need is for elimination of the anachronistic, obviously inadequate gasoline taxes, and the substitution of a realistic use charge that will put the enormous cost of highways where such cost belongs. Only then will present frenzied overconstruction be replaced by a rational program that is tailored to American needs.

Alvin L. Spivak, P.E.
Glendale, Ohio

Slavery? . . .

Dear Editor:

Mr. R. B. Macfarlane in the September issue of AE ("Letters to the Editor") arrives at the conclusion, after some delusive argumentation, that engineers through registration "have started on the road that leads to slavery." In my opinion there are far more fundamental aspects to this matter than the political considerations presented by Mr. Macfarlane.

In considering this question we are confronted with a question which has perplexed philosophers through the centuries viz., does society exist for each one of us or does each one of us exist for society?

It was Aristotle who long ago stated that the whole was more important than any of its parts. This reasoning has been refined to the point where it may be applied directly to the matter of engineering registration by the French philosopher Jacques Maritain. Using the same distinction between an individual and a person as Thomas Aquinas, Maritain says, "While the person as such is a totality, the individual as such is a part; while the person, as person or totality, demands that the common good of temporal society should flow back to him, and while through his ordination to the transcendent whole, he even surpasses the temporal society, the same person, as an individual or as a part, is inferior to the social whole and must serve the common cause as a member of the whole."

When dealing with man, the engineer, we are dealing with man, the individual and not with man, the person. Space does not permit a full development of the full distinction between the individual and the person but in a manner of speaking we might say it is similar to the distinction between the body and the soul.

A basic role of society is to provide for each of us a maximum opportunity to achieve those good things which we each desire. However, in exercising this freedom to achieve these things it is inevitable that we become involved with other people simultaneously exercising their freedom. From freedom necessarily follows responsibility, and from this it follows that man is responsible to his fellow men for any of his actions which affect them.

Society provides each of us with food, shelter, police protection, education, and a myriad of other things which, if left to our own devices, we could do little to achieve. Shall we give nothing in return? There are many restraints and sacrifices required of each of us by our obligations to society or the general public as it is more usually called in our engineering registration laws.

There is as much moral justification for men who profess to be engineers to prove to society that they are qualified to render these services as there is for society to demand a test of the ability of those who profess to be competent automobile drivers.

It is true that men who would practice engineering are deprived of a freedom, either by registration if they are competent or by total abstinence from the practice of engineering if they are incompetent. This sacrifice is necessary because of the superior right of the general public to be protected from those who would practice engineering but are not qualified to do so. To say that the exercise of this right of the general public to protect itself from its members puts us on the road to slavery is an impetuous conclusion that is not justified in the light of reason.

W. J. Deevy, P.E.
Beaumont, Tex.

'Best Educational Article' . . .

Dear Editor:

I read Dr. Russell's article on education (AE, July). I thought it the best educational article I have ever seen in an engineering magazine. He called his shots exactly and just as they should be in my opinion. He refrained from getting mean about anything and he certainly did have the opportunity to do so.

He could have pointed out how badly the engineering profession neglected education during the lean years for engineering. He could have shown how we engineers dragged our feet in encouraging the retention of a curriculum which would educate children to compete with us. He didn't point this out so I shall do so now and shall state that during the last forty years the engineers, the scientists, and the mathematicians have been actively plugging for such subjects for less than ten years. I cannot point with pride to the "encouragement" record of the two national engineering societies and

(Continued on page 54)

"This Month"

Since 1952 the reports of the Professional Engineers Conference Board for Industry have dug out facts upon which sound programs for the advancement of the P.E. in industry could be built. Now the latest depth survey—Number Six—is off the press and deals entirely with what engineers and management think professionalism is and what can be expected of it. A briefing on the new report begins on page 23.

It is so important a subject these days that we are pleased to run another article on city planning and the engineer's work therein. It is almost a social obligation for the profession to take a hand in this area and the article on page 26 will give some reason why.

Are ethics only wispy, ephemeral things that after-dinner speakers expound upon at great length or can there be a practical, workable side? All registered, professional engineers should read "Practical Ethics for the Professional Engineer," page 31.

"Tragic and baffling"—two words which best describe "The Failing of the Malpasset Dam," page 34. Our "Engineer at Work" piece "This Month" reminds us again of the tremendous responsibility the profession shoulders.

Can professionalism be taught? Can young students be impressed with the non-technical? The answer is a resounding "Yes!" and it is supplied by professors from Tulane University who are "Teaching Professionalism," page 36.

Briefing the news sections:

General. Page 12. The headlines: Awards for Student Papers on Engineering Announced . . . Kipp Elected AIME President . . . Professors Win 3-Year Grant to Study Filters . . . AEC Provides Material on Nuclear Energy . . . Program for Water Conference Planned.

Consulting. Beginning on page 14 the lead story reports upon regional meetings by consulting engineers under the functional section setup. Meetings at San Antonio, Texas, and Indianapolis, Ind., have been most successful. In other news: Stories on new funds for the lagging highway program and about new rules of the Internal Revenue Service regarding expense accounts.

Education. The Eastman Kodak Company has awarded another $800,000 to 100 American colleges and universities. The money will go for advanced study largely in science, engineering, and business. Full story, page 16. Other headlines: PIB Breaks Ground for Graduate Center . . . Johns Hopkins Forms Department of Mechanics . . . Stanford U. Plans Telescopic Research.

Industry. Page 18. Two giant AFL-CIO unions have come back fighting with announcements that they would launch two big drives aimed at signing up professional and technical employees in industry. Other stories report on new nuclear reactor at Cornell . . . defeat of a union drive in Philadelphia . . . latest ARBA salary survey of highway engineers' salaries.

Government. The Bureau of Public Roads has released information showing that stiff competition keeps highway estimates at lower levels. Page 20. Other stories cover American Management Association report on manpower and a letter from NSPE to the President of the U.S. asking him to appoint a P.E. to positions with the new National Capital Transportation Agency.

AND don't miss the full coverage of the recent NSPE Denver meeting! Page 42.

Kenneth E. Trombley
Editor

General News

Awards for Student Papers On Engineering Announced

The annual awards for engineering undergraduate papers on welded machine and structural design have been announced by the James F. Lincoln Arc Welding Foundation of Cleveland, Ohio.

A total of $5000 in forty-six awards were made to engineering undergraduates in twenty-one different engineering colleges. Students in the Unversity of Wyoming made the best showing for any one school. A total of fifteen awards were made for papers submitted by undergraduates of Wyoming. University of Illinois students were second in total performance, taking four awards. Awards were made for papers explaining how the efficient application of welded steel to the design of a machine or structure contributed to its improvement or cost reduction.

First award of $1250 went to Glenn F. Balfanz, Jr., of Cicero, Illinois, for his paper, submitted from the Department of Mechanical Engineering of Northwestern University, on the redesign of a pump discharge head. Second award of $1000 was received by John R. Cortelyou, Los Angeles, California, who submitted a paper as a student at California State Polytechnic College on the redesign of a foot bridge. Donald Belz and Martin Skeer, of Glendale and Brooklyn, New York, shared third award of $500 for their joint paper on a marine salvage float. They submitted the paper as students in the Civil Engineering Department of The Cooper Union in New York. The schools in which these student were enrolled received equal amounts to use as scholarships in the respective departments.

Professors Win 3-Year Grant to Study Filters

The National Institutes of Health of the U.S. Public Health Service have announced a grant award of $56,751 to co-investigators Paul E. Morgan, P.E., associate professor of civil engineering and Dr. E. Robert Baumann, P.E., professor of civil engineering of Iowa State University. The grant will finance a 3-year study of "Design Reqirements for Municipal Diatomite Filters."

Professor Baumann has returned to Iowa State University after completing a year of postdoctoral study under a National Science Foundation Science Faculty Fellowship at the University of Durham, Kings College, Newcastle on Tyne, England.

MORT CLARK'S GALV-WELD ALLOY ORIGINAL & GENUINE

Withstood 3389 hr. Gov't. salt spray test—23 years field exposure. Eliminates bolts and rivets, specify for pipe joints, Galv., structures, tanks, ducts, cold storage and packing plants, drains, washers, towers, steel bldgs., repairing skips. GALV-WELD PRODUCTS, Dept. AE-3, P. O. Box 1303, Bradenton, Florida.

(Circle 1 in Readers' Service Dept.)

"Another box of cigars just came for you from our paper supplier!"

Earl M. Kipp Elected 1961 AIME President

Earl M. Kipp will be the 1961 president of the Society of Petroleum Engineers of AIME (American Institute of Mining, Metallurgical and Petroleum Engineers), taking office in February, 1961, it has been announced. He is special consultant—producing problems on the staff of the vice-president in charge of producing for Standard Oil Company of California in San Francisco.

Mr. Kipp will replace 1960 President Wayne E. Glenn, production manager for Continental Oil Company. Vice presidents retiring at that time will be R. A. Morse, associate director of research for Gulf Research & Development Company in Pittsburgh, Pa., and W. D. Owsley, senior vice president of Halliburton Company, Duncan, Oklahoma.

New vice-presidents for 1961 will be Milton E. Loy and L. P. Whorton. Mr. Loy is southeast area manager for Schlumberger Well Surveying Corporation in New Orleans. Mr. Whorton is research manager for the Research and Development Laboratories of The Atlantic Refining Company, Dallas.

AEC Provides Material On Nuclear Energy

The Atomic Energy Commission has arranged to make available—at a price considerably below that previously charged—copies of engineering materials covering virtually every aspect of the nation's nuclear energy program.

The materials include drawings, photographs, sketches, design criteria, specifications and parts lists which have been prepared as part

of various engineering and construction programs carried out by the AEC and its contractors.

Previously, the materials were reproduced by a photographic process and made available for sale. However, because of the reproduction process, costs were relatively high.

In announcing the new program today, Robert L. Shannon, chief of OTI Extension, said an arrangement has been made with Cooper-Trent Blueprint & Microfilm Corporation in Arlington, Virginia, whereby the AEC will turn over to the firm all engineering materials. Cooper-Trent then will produce blue-line, or blueprint-type, copies which will be available for sale at seventeen cents per square foot.

"The principal objective of the Engineering Materials Program is the immediate and wide dissemination of AEC engineering materials for use in advancing the peacetime applications of nuclear energy," Mr. Shannon said.

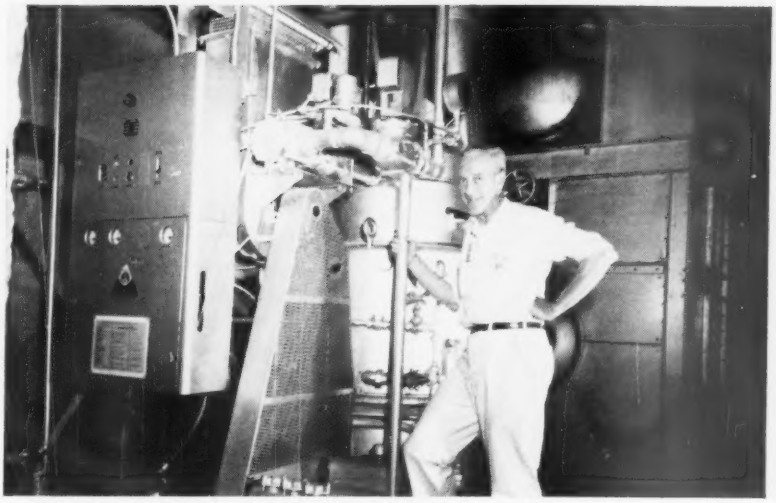
Program for Water Conference Planned

"Problems and Progress in Water Pollution Control" will be the theme of the water pollution conference in Washington, D.C., December 12-14.

Sponsored by the U.S. Department of Health, Education, and Welfare, the conference will seek to assess the status of the water pollution problem as it relates to the nation's total water needs now and in the near future. Three hundred national groups have been invited to participate in the four panel discussions centering a study of the present situation and ways and means of keeping water clean.

Four members of Congress who will speak at the conference are Senators Robert S. Kerr (D-Okla.) and Francis Case, (R-S.D.), and Representatives John A. Blatnik, (D-Minn.), and William C. Cramer, (R-Fla.). The conference will include a banquet Monday night, and summarization of conclusions on Tuesday.

"NO MORE BOILER ROOM SPACE ...BUT WE NEEDED MORE STEAM"



Chief engineer Porter Murphy beside 150 bhp Vapor Modulātic Water Tube Boiler which was fitted into small space at rear of old boiler.

Strong Cobb Arner solved this problem with a Vapor Modulātic Water Tube Boiler

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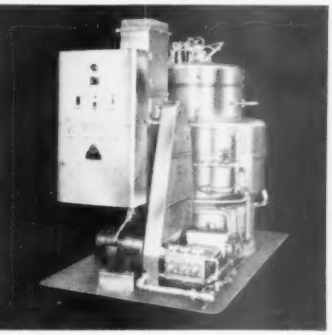

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(Circle 2 in Readers' Service Dept.)

AE Consulting

Regional Organization May Improve Functional Sections

Reports from the first two of a series of planned regional meetings for consulting engineers indicate a favorable response to the regional organization concept, and give hope that the new program may indeed provide valuable coordination between the national and local functional sections. In addition, the broader representation made possible by regional meetings has already given evidence that many new ideas and programs may be forthcoming.

Reports have been received on meetings held for the Southwest region on October 3rd in San Antonio, and for the Central Region on September 16th in Indianapolis. The two meetings were organized and presided over by Frank H. Newnam, P.E., Southwestern vice-chairman, and Clyde E. Williams, P.E., Central vice-chairman. Other meetings, not as yet reported, were planned for the Southeastern Region in Atlanta on September 29th, the North Central Region in Omaha on October 6th, and for the Western Region in Boise on November 4th. Results of these meetings will be reported next month.

Topics considered at the San Antonio and Indianapolis meetings covered wide ranges of subjects and programs of interest to consultants. High on the list of priority at both meetings was the question of how best to finance the activities of the state and national functional sections. There was general agreement that the primary burden of financing must fall on consultants and consultant groups, and the thought was expressed that expanded activities at the national level might best be aided by contributions from state functional sections.

The American Road Builders' Association plan to provide a system for accreditation of consulting firms wishing to provide services for work on state and national highways was also extensively discussed. Many consultants present at the meetings feared that possible side-effects could cancel out benefits, and that considerable study and possible revisions would be necessary before the plan should receive NSPE support.

Responding to a request from the Louisiana Society of Professional Engineers, consultants attending the Indianapolis meeting discussed the meanings and legal implications of the commonly used contract terms "supervision of construction" and "resident inspection of construction." The subject was referred to the regional meetings after the Louisiana Society had requested NSPE definitions of the two terms to aid in the defense of a Louisiana engineer being sued for damages arising from alleged negligence in "supervision of construction." It was generally felt that more definitive contract terms carefully limiting responsibility of the engineer will provide the most effective protection in such actions.

At the Southwestern meeting considerable discussion was devoted to the areas of competitive bidding, free engineering, and architect-engineer relations. Most consultants present felt that these matters, with the exception of free engineering of a national scope, could best be handled on the state and chapter level.

Other items covered were as follows:

- The Southwestern consultants felt that a definite need exists for an expanded public relations program. It was recognized that effective programs in this field can be expensive, but the majority nevertheless expressed the opinion that the potential benefits warrant additional expenses.

- Approval was expressed concerning NSPE handling of the Reader's Digest article attacking the Federal-aid highway program. It was recommended that NSPE continue to meet such adverse publicity with direct action.

- The self-employed retirement bill was discussed at the Southwestern meeting with particular attention to recently incorporated changes. Most consultants present favored the original bill as passed by the House of Representatives, feeling that the revised version provides only limited benefits.

Funds to be Increased for Highway Program

The Federal interstate highway program has received a shot in the arm as Secretary of Commerce Mueller announced that Federal funding will be increased by $718 million over original plans for the remainder of 1960.

The action represents a 44 per cent increase over the $1.6 billion originally authorized for use in the last six months of 1960. It was not reported whether the change will have any effect upon plans for Federal reimbursements to states in 1961.

The Bureau of Public Roads has announced that competition has been so keen for interstate construction contracts during the first half of 1960 that low bids have averaged 11.9 per cent under state engineers' estimates. The average number of bidders on these projects has been eight.

(Circle 2 in Readers' Service Dept.)

IRS Announces Rules for Expense Accounts

The Internal Revenue Service has announced in a technical information release the rules which will be followed in dealing with entertainment and employee expense accounts deducted as business expenses by corporations, partnerships and individual proprietorships.

In the case of corporations and partnerships, expense account information must be submitted along with the tax return forms for the 25 highest paid officers or partners receiving incomes over $10,000. Expense account payments must be included with salary and other income in determining which are the highest paid and whether or not their incomes exceed $10,000.

Expense account information need not be submitted, "In the case of persons supplying legal, accounting, engineering or other professional services, the expenses which will be billed directly to the client. However, these persons should maintain records reasonably sufficient to establish the business purpose for the expenditure."

In the case of consultants being reimbursed by clients for out-of-pocket expenses, records concerning personal or employee expense accounts need not be filed with the consultant's income tax return, but must be maintained to "establish the business purpose for the expenditure."

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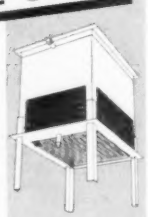

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(Circle 3 in Readers' Service Dept.)

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ENGINEER IN GOVERNMENT NEWSLETTER

The NSPE Functional Section for Engineers in Government Practice has inaugurated a new, regular monthly publication, *Engineer in Government Newsletter*. The Newsletter, according to Section Chairman, Wesley E. Gilbertson, "is designed to further communications among all engineers in government practice, and between the NSPE Functional Section and government functional sections at the state and local level."

Gilbertson added that "we view this Newsletter as being a clearing-house for the exchange of information and news on all developments of particular interest to engineers in government practice and their respective employers."

Interested engineers who desire to receive the *Engineer in Government Newsletter* each month should fill out and mail the coupon below.

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Hundred Colleges Receive Kodak's Annual Awards

- Grants Based on Total Graduates
- Planned to Help Meet Rising Costs

Contributions amounting to more than $800,000 have been awarded to about 100 American colleges and universities under the Eastman Kodak Company's annual aid-to-education program, the company has announced. The amount is moderately above Kodak's total contributions last year.

The company's program this year calls for sixty-five direct grants; forty-four fellowships for advanced study in science, engineering, and business; and a variety of special contributions.

During the past five years, Kodak's total expenditures under its aid-to-education program have amounted to about $3.5 million.

"We look upon aid to education as an investment in the future—an investment which will bring continuing benefits to American industry and to the nation as a whole," commented Thomas J. Hargrave, chairman, and William S. Vaughn, president.

"Kodak's program is designed to help schools meet their rising costs and to support learning in the fields of higher education," they said. "In addition to providing some immediate assistance, we hope the program will encourage additional financial help from other interested groups and individuals."

The direct grants for 1960, totaling about $290,000, were given to privately supported colleges and universities, which may use the funds in any way they wish. The grants are based on the number of graduates of these institutions who joined Kodak five years ago and are presently employed by the company.

The fellowships, which are for the 1961-62 academic year, are valued at more than $150,000. The students to receive them will be chosen by the colleges to whom the fellowships have been awarded.

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(Circle 4 in Readers' Service Dept.)

PIB Breaks Ground for Graduate Center

Ground has been broken for Polytechnic Institute of Brooklyn's new Graduate Center, Long Island's first graduate school of engineering.

The facility, with attendant research laboratories, is being established at a cost of $1,600,000 on twenty-five acres of land located on Route 110, a half mile east of the Nassau-Suffolk border. Donated to Polytechnic by Republic Aviation Corporation, the site was formerly part of Republic's Farmingdale property.

Taking part in the ground breaking ceremonies were Dr. Ernst Weber, president of Polytechnic; Preston R. Bassett, chairman of Polytechnic's board of trustees and retired president of Sperry Gyroscope Company; Dean Charles E. Schaffner, director of planning; Dr. Anthony B. Giordano, dean of the Graduate school, and members of the Institute's Long Island Advisory Council.

The approved plans for the center, worked out by the architects in conjunction with Polytechnic's teaching and research faculty, call for two buildings with a total of 65,000 square feet of floor space.

The main biulding will be a combination one- and two-story structure. It will provide nine classrooms with seating capacities ranging from 30 to 200, a science library for 20,000 volumes, administrative offices, dining area, lounge and meeting room. The dining area, lounge and meeting room are of a flexible design, capable in combination of seating up to 500 persons.

Included in the main building will be twelve laboratories for research in aero-space engineering, electrical engineering, physics and electrophysics. The main building will contain 53,000 square feet of floor space.

The second building will be a steel frame structure of 12,000

square feet, housing three laboratories for basic research in aerodynamics and high power electronics. It will be covered with aluminum and expandable in all four directions.

Engineering Students Enroll for Fellowships

Forty-eight highway engineering students from thirty-eight countries have enrolled for postgraduate training under the 1960-61 fellowship and bursary program of the International Road Federation (IRF).

This is the largest delegation for a single school year since the IRF training program was inaugurated in 1949. Altogether, 264 engineers from seventy-one countries, including the current class, have participated in the program.

Forty-four of the 1960-61 fellowship students are enrolled in United States Universities (Ohio State, Yale, Northwestern and Purdue) and four are studying in Great Britain (Birmingham and Durham Universities).

After completing their academic year, the engineers will make an observation tour of highway installations and industrial facilities. Then they will return to their home countries, where their specialized knowledge will be applied in positions of responsibility and leadership.

Vietnam has the largest representation of students in this year's class—six.

The current crop of graduate engineers are from Argentina, Australia, Austria, Belgium, Brazil, Bolivia, Canada, Colombia, Costa Rica, Cuba, El Salvador, France, Ghana, Haiti, Hong Kong, Iceland, India, Iran, Iraq, Italy, Jamaica, Japan, Korea, Lebanon, Malaya, Nigeria, Norway, The Philippines, Southern Rhodesia, Spain, Sudan, Surinam, Sweden, Thailand, Uganda, United Arab Republic, Venezuela and Vietnam.

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Johns Hopkins Forms Department of Mechanics

The Johns Hopkins University School of Engineering announced today the consolidation of its departments of aeronautics, civil engineering, and mechanical engineering into a single unit to be known as the Department of Mechanics.

The announcement was made by Milton S. Eisenhower, president of The Johns Hopkins University, and Robert H. Roy, Dean of the School of Engineering.

Also announced was the appointment of Dr. George Benton to be chairman of the new department. Dr. Benton is professor of meteorology and former acting chairman of the department of civil engineering.

The action creating the new department was taken on the initiative of the faculties of the departments concerned, Dean Roy explained, and with the approval of the Advisory Board of the School, the Visiting Committee of the School of Engineering, and the administration and trustees of the University.

The change will become effective beginning with the current academic year, although students now enrolled may maintain their existing study programs.

The new action now leaves the School of Engineering with departments of chemical, electrical, industrial, and sanitary engineering, along with the new department of mechanics.

Stanford U. Plans Telescopic Research

A new Radio Astronomy Institute has been formed at Stanford University to implement an expanded research program in which distinguished visiting scientists will take part.

Experts from Japan and Australia already have made visits under Institute aegis. It will support a continuing group of such visiting specialists who will augment the Stanford research staff. The Air Force Office of Scientific Research sponsors the Institute.

Research work employing the telescope will be increased and emphasis will be on basic research in solar-terrestrial physics, galactic radio astronomy, radio interferometry, radiometry, and related areas.

Visitors so far include Australia's Stefan F. Smerd and Japan's Professor Takakiyo Kakinuma. Smerd, a staff member of the Radiophysics Laboratory of the Commonwealth Scientific and Industrial Research Organization in Sydney, is coordinator for the International Geophysical Year program of worldwide radio astronomy observations.

Professor Kakinuma is a member of the Research Institute of Atmospherics at Nagoya University.

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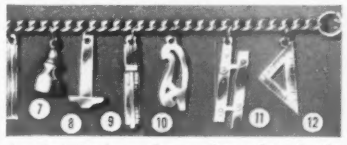

An intriguing charm bracelet (only partly illustrated above) for the wife, daughter and sweetheart of the professional draftsman, architect and engineer. Among its twelve accurate tools and instruments are the movable proportional dividers, protractor, drawing table, triangular rule, T-square, slide rule, etc. Hamilton Gold Plated—$4.98. In solid sterling silver—$19.95. In solid 14K Gold—$119.00. Prices include gift box, Fed. Tax and Postage. ORDER TODAY on money back guarantee. Individual charms available in sterling silver and 14K Gold—see price list below. Free catalog of professional gifts sent on request.

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(Circle 5 in Readers' Service Dept.)

Unions Start Membership Drive Among Professionals

Brushing aside recent rebuffs to organized labor by professional employees at Western Electric and Sperry Gyroscope, two giant AFL-CIO unions pledged at their recent conventions to bolster lagging memberships with big drives on professional and technical employees in industry.

With combined total memberships of over 1,270,000, the International Association of Machinists and the International Union of Electrical Workers pointed to the shifting ratio of blue collar to white collar employees as the reason for corresponding changes in organizing efforts.

Citing a ten per cent drop in membership in the last four years, IUE President James B. Carey exhorted delegates at the union's September convention for a fifty per cent dues increase, saying that he plans to put fifty new organizers in the field to spearhead the new white collar drive.

To aid the new organizers, the IUE delegates passed a resolution to form a National Engineering Council, patterned on the one established by their District 4 unit in June, which will have membership restricted to IUE professional and technical units.

While limiting membership to professional and technical units, the text of the resolution stressed that production workers and professionals "belong together," and said that "The IUE has demonstrated that clerical workers, technical workers, and professional engineers can be organized; that they can become dedicated workers within the labor movement."

At the September Grand Lodge Convention of the International Association of Machinists in St. Louis, a similar resolution was passed calling for the IAM to "set up a program of organization of technical, office, white collar, and professional workers in our traditional areas of interest. . . ."

The IAM also noted the changing ratio of blue collar to white collar workers. "Fortunately," said the IAM officers in a statement to the convention, "the IAM already has a sizeable core of technical and office workers organized in some of the larger aircraft plants, constituting a firm foundation for future organization."

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(Circle 6 in Readers' Service Dept.)

Nuclear Reactor Used to Train Scientists

A nuclear reactor facility which will provide training for many of America's potential atomic scientists and engineers is taking shape on the Cornell University campus.

The facility was designed and engineered by Vitro Engineering Company in cooperation with Cornell scientists and engineers and is expected to be ready for operation next June. General Atomic has the contract for construction of the TRIGA reactor and Curtiss-Wright for the zero power reactor.

The National Science Foundation and the Atomic Energy Commission have made grants to the center which will cost an estimated total of $1,660,000.

The zero power reactor will be used for studying the basic mechanisms by which a self-sustaining reaction may be produced and utilized, and for examining the interaction between neutrons and their surroundings. Scientists and engineers will be able to learn more how neutrons behave under a variety of conditions. Because it will be a modified critical assembly, the device will have a flexible design for studying reactors themselves. It will be the only university-owned reactor in the country to possess this flexibility.

The TRIGA training reactor will enable Cornell's science and engineering students to gain first-hand experience in the study of nuclear processes. It will also be used in research programs at the University.

The facility will be under the direction of Prof. Trevor R. Cuykendall and Assoc. Prof. David D. Clark of the Department of Engineering Physics at Cornell.

Philadelphia Engineers Defeat Move for Union Shop

As a result of pressure from Philadelphia city engineers and the Philadelphia Chapter of the Pennsylvania Society of Professional Engineers, the American Federation of State, County and Municipal Employees, AFL-CIO, has lost out in its attempt to insert a professional union shop clause in their new contract with the city.

Although it was reported that Mayor Richardson Dilworth and the majority of the City Council had at first agreed to the union shop demand, the overwhelming resistance to the plan caused the compulsory membership requirement to be dropped in favor of a "voluntary" arrangement. A spot check taken by *Engineering News-Record* magazine among professional employees of the city's water, streets, property and license departments indicates that no city engineers have as yet joined the union.

IAM delegate Dorothy Moellring, of the Lockheed local, renounced the "special approach" method for organizing white collar workers. "What we want is for the people who have not organized the office and technical people who are in our industry, to consider them the same as machinists who work with their hands," she said. Experience has shown that office and technical people can be organized just as easily as shop people "when they realize the benefits they can obtain," said the delegate.

ARBA Releases Survey on Highway Engineers' Salaries

The following figures, as released in the sixth American Road Builders' Association Survey of State Highway Engineers' Salaries, show the maximum, minimum and average salaries paid to various classifications of engineers within state highway departments as of the summer of 1960. (See chart)

The complete survey, available at no charge from ARBA in the World Center Building, Washington 6, D.C., contains a complete state-by-state breakdown of maximum, minimum and average salaries paid to the above classifications of state highway engineers.

	Average Maximum Salary	Average Minimum Salary	Weighted Average Salary
Executive or Chief Administrative Officer	$16,063	$14,177	$15,817
Chief Engineer	15,279	13,736	14,311
Deputy or Assistant Chief Engineer	13,691	11,582	12,002
Road Design Engineer	12,003	9,913	11,430
Bridge Engineer	11,974	9,900	11,110
Maintenance Engineer	12,386	10,244	11,453
Construction Engineer	12,246	10,119	11,345
Administrative Engineer	11,583	9,828	10,714
Chief Clerk or Auditor	10,356	8,537	9,592
Materials or Testing Engineer	11,693	9,650	10,841
Right-of-Way Engineer	11,518	9,499	10,707
Planning Engineer	12,135	10,093	11,345
Traffic Engineer	11,339	9,632	10,615
Safety Engineer	8,643	7,107	8,085
Equipment Engineer	9,737	7,973	8,924
Utilities Engineer	9,242	7,634	8,423
Secondary Roads Engineer	11,185	9,294	10,459
Landscape Architect	8,827	7,149	8,159
Personnel Officer	9,827	8,151	9,144
District or Division Engineer	11,540	9,442	10,567
Resident Engineer	8,644	6,537	7,728
Instrument Man	5,931	4,404	5,244
Engineering Aide	5,166	3,355	4,082

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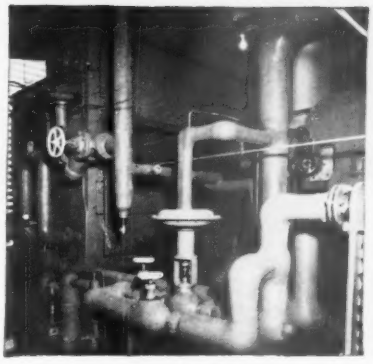

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(Circle 7 in Readers' Service Dept.)

Competition Keeps Highway Estimates At Lower Level

Competition is continuing keen for highway work, the U. S. Bureau of Public Roads has reported, with the result that the prices are well under estimates prepared by state highway departments.

An analysis of 1,706 contracts awarded during the first six months of this year for projects on interstate and other primary system routes indicates that the low bidders were 11.1% under the state engineers' estimates. In 29 states, savings ran even higher.

In fact, in five states, contractors' low bids during this period ran more than 20% under the engineers' estimates. In no state are construction costs running over the engineers' estimates. The total amount of work represented by these low bids in all states was nearly $1.3 billion. An average of 7.2 contractors bid on each contract advertised during this period.

Interstate highways, particularly, because they are so large, have been criticized as being far more costly than originally estimated. Yet, according to BPR statistics, competition is even keener for these projects (8 bidders per contract), and prices are even lower (11.9% under engineers' estimates).

AMA Study Reveals Variations in Manpower

Wide variations in the number of persons hired to perform virtually identical functions in industry are revealed through a nation-wide study of representative corporations released by the American Management Association. Economies effected since preliminary figures became available range from $36,000 a year for a single operation in one company to more than $1,000,000 annually by another. The project was described by AMA as one answer to the profit squeeze.

Variations of 50 per cent in manpower used to perform standard administrative tasks are common, the study shows. In two industry groups variations of 200 and 500 per cent were discovered in general administration work. One company found it had 700 per cent more employees in personnel work, in proportion to the total work force, than another corporation in the same industry.

Major industry groups represented in the project are: chemicals, drugs, petroleum, rubber, metal fabricating, aircraft, machinery, electronics, electrical machinery, food, paper and textiles.

The project was originally designed by the American Management Association to investigate numbers and ratios of administrative employees. These not only represent costs difficult to control and justify but have increased enormously in numbers in the past decade, compared with a decrease in proportion of production workers. The study now provides meaningful comparisons among many additional classes of workers, most of which have produced wide and puzzling variations. The project will be continued indefinitely. Additional industry groups will be formed to gather similar data relevant to their fields of business.

NSPE Urges President to Employ PE's

Letters urging the appointment of qualified engineers to positions with the National Capital Transportation Agency were sent to President Eisenhower recently by both Leonard Crook, president of the District of Columbia SPE, and NSPE Executive Director Paul H. Robbins.

Crook urged the President that "more efficiency and economy will result if the policy-making direction and administration of this basically technical program is accomplished through qualified engineers." Included in his letter was a list of engineers recommended by the DCSPE for positions of administrator, deputy administrators, and members of the board.

NSPE

to Remember

North Dakota Society of Professional Engineers—Annual Meeting, November 3-5, 1960, Plainsman Hotel, Williston, North Dakota.

Wyoming Society of Professional Engineers—Annual Meeting, November 5, 1960, Henning Hotel, Casper, Wyoming.

Arkansas Society of Professional Engineers—Annual Meeting, November, 1960, Little Rock, Arkansas.

Puerto Rico Society of Professional Engineers—Annual Meeting, November, 1960, Building of the Colegio de Ingenieros, Hato Rey, Puerto Rico.

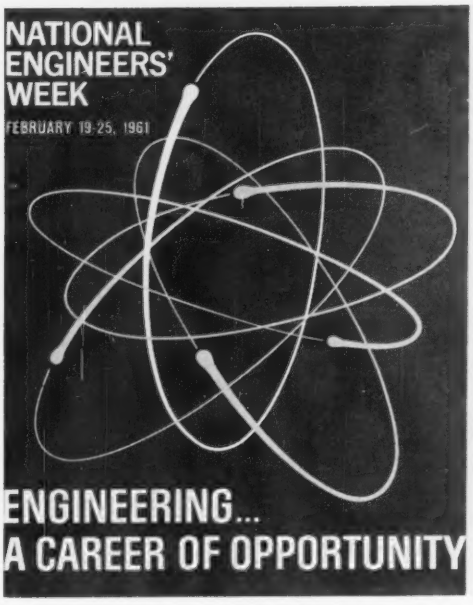
Professional Engineers of Oregon—Annual Meeting, November 11-12, 1960, Marion Hotel, Salem, Oregon.

Maine Society of Professional Engineers—Annual Meeting, November 5, 1960, Augusta, Maine.

National Society of Professional Engineers—Winter Meeting, February 9-11, 1961, Hotel Ft. Des Moines, Des Moines, Iowa.

National Society of Professional Engineers—Annual Meeting, July 4-7, 1961, Olympic Hotel, Seattle, Washington.

Engineers' Week Has 14 Sponsors



Promotional Material for Your Chapter's 1961 National Engineers' Week Program

Cover design for the 1961 National Engineers' Week promotional kits which were mailed in October to all NSPE affiliates. Additional kits for local chapter or state society use may be obtained from National Society headquarters.

Fourteen leading engineering figures from industry, education, government, and private practice will serve as individual sponsors for the 1961 National Engineers' Week, February 19-25.

The sponsors are: Werner von Braun, director, George C. Marshall Space Flight Center, National Aeronautics and Space Administration; John L. Burns, P. E., president, Radio Corporation of America; Allen B. Du Mont, P. E., group general manager, Allen B. Du Mont Laboratories; Division of Fairchild Camera and Instrument Corporation; William L. Everitt, P. E., dean of engineering, University of Illinois; James F. Fairman, P. E., senior vice president, Consolidated Edison Company of New York; V. E. Gunlock, P. E., chairman, Chicago Transit Board; Titus LeClair, P. E., manager, Nuclear Power Applications, General Atomic Division, General Dynamics Corporation; Clarence H. Linder, P. E., vice president, General Electric Company; Major General A. M. Minton, P. E., director of civil engineering headquarters, United States Air Force; R. H. Roy, P. E., dean, school of engineering, Johns Hopkins University; Ole Singstad, P. E., consulting engineer; Raymond R. Tucker, P. E., mayor, City of St. Louis; A. V. Wiebel, P. E., president, Tennessee Coal & Iron Division, United States Steel Corporation; Frederick H. Zurmuhlen, P. E., R. A., commissioner, Department of Public Works, City of New York

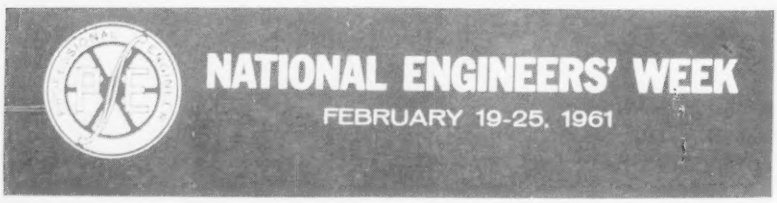
The sponsors' names will appear on the letterhead of three mailings to be made for the Engineers' Week Committee. These mailings will be sent to a list of 800 publishers of daily newspapers, 6000 consulting engineering firms, and more than 1000 presidents of industrial firms employing large numbers of engineers.

The theme of the 1961 Engineers' Week observance is "Engineering . . . A Career of Opportunity," selected to help in conveying to young people something of the scope and extent of the career possibilities which are opening for the engineering graduate in many fields.

Promotional kits for the Engineers' Week observance were mailed in October to all state societies and local chapters. The kits contain samples of the posters, banners, lapel buttons, bumper stickers, and gummed seals, along with suggestions for developing a basic Engineers' Week program at the chapter level. Suggested activities

(Continued on page 51)

Design for bumper sticker for the 1961 National Engineers' Week.



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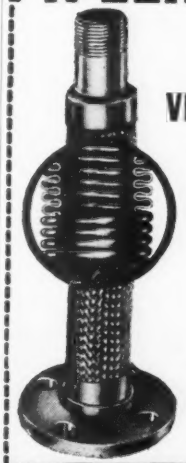

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American Engineer

A New Report
by the
Professional Engineers Conference
Board for Industry

Engineering Professionalism in Industry

THE Professional Engineers Conference Board for Industry in cooperation with the National Society of Professional Engineers has made the sixth of its depth surveys—this one on Engineering Professionalism in Industry. The survey is another of the annual reports established in 1952 by the Board, and was conducted by the Opinion Research Corporation of Princeton, N. J.

A few of the interesting facts uncovered in the survey are:

- Only 17 per cent of the engineers interviewed were fully satisfied with their profession.
- Fifty per cent of the engineers interviewed felt their professional status was recognized to only a moderate degree by the company.
- Belonging to professional societies was the move most frequently cited by engineers as a step to improve the status of the profession.
- Almost 70 per cent of the managers interviewed felt that identifying an engineer's name with his work would advance the profession.
- Ninety-eight per cent of the managers interviewed felt that unions for engineers would hurt the profession.

Depth interviews of engineers and managers in both large and small industry was the method for obtaining the information. The report is based on 350 personal interviews conducted between April and August of this year. The six major industries represented in the survey are chemicals, electronics, petroleum, rubber, aircraft manufacturing, and electrical instruments and machinery, which included companies recognized for maintaining high standards of professionalism and companies whose standards in this vein were not so high.

The 66-page report, which also includes an appendix giving the questions with tabled answers, has several highlights which can be summarized. First of all, high proportions of engineers and managers agree that it is very important for engineers to have a thoroughly accepted status of professionalism in their

companies. Agreement of objectives is a favorable starting point.

The survey revealed that the concepts of what professionalism means cover three main areas. The first, having the qualifications of a good engineer, includes technical competence and skill along with being able to generate one's own ideas, being individually responsible, and maintaining high standards of professionalism.

Being able to practice the engineering profession under favorable conditions was the second general concept. Essentially, engineers surveyed did not want to be tied down by more routine tasks and thus be prevented from using his more technical training.

The third concept involves enjoying recognition, not necessarily in the economic vein, but less tangible types of recognition which lend prestige, stature, and dignity to the profession. In general, managers agreed with the ingredients of professionalism, but they tended to put more stress on engineer's qualifications than did the engineers interviewed.

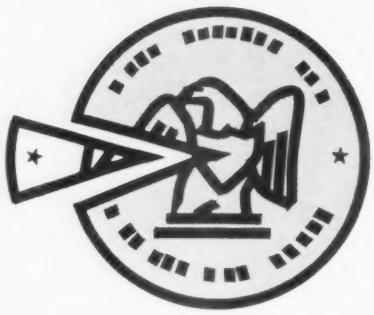
Engineers even in companies recognized for maintaining high levels of professionalism felt that there is still much to be done to bring professionalism to a high enough level in industry.

In both types of companies where interviews were held, both managers and engineers felt that the profession could be more respected, but in both cases the managers felt the profession was more recognized than did the engineers.

A number of suggestions were offered by both sides as to what can be done to build the profession, from

Desire for Advancement

"A" companies designate those in which high standards of professionalism are generally maintained as recognized by expert observers. "B" companies are those in which the standards of professionalism are not so high.



Sufficient Financial Reward

Things Companies Can Do to Build Professionalism (Per Cent Saying "Very Important")

	Engineers			Managers		
	Total	A Cos.	B Cos.	Total	A Cos.	B Cos.
Identify engineer's name with his work	55%	66%	46%	69%	92%	50%
Provide adequate grievance channels	54	46	60	75	84	67
Give engineers freedom to advance technical aspirations	52	55	49	40	52	30
Give time and encouragement to prepare technical papers	51	48	52	42	60	27
Keep careful eye on job titles	45	51	41	67	72	63
Encourage society membership and attendance at meetings	43	48	38	44	56	33
Give engineers voice in what projects they work on	37	35	38	24	32	17
Let engineers use company facilities for experimenting on own time	22	23	20	9	12	7
Encourage participation in community affairs	16	22	10	25	48	7

Preparation of Papers

Things Engineers Do to Build Professionalism (Per Cent of Engineers Who Say They Do This, and Per Cent of Managers Who Say a Majority of Their Engineers Do This)

	Engineers			Managers		
	Total	A Cos.	B Cos.	Total	A Cos.	B Cos.
Investigate economic factors top management must consider	35%	34%	36%	7%	8%	7%
Belong to professional or technical societies	72	72	72	49	48	50
Register as a "P. E."	39	57	25	11	20	3
Attend society meetings	48	51	45	29	36	23
Prepare papers for publication	20	18	22	7	4	10
Take part in community activities related to engineering	14	14	14	15	24	7
Take part in nonrelated community activities	44	52	38	24	36	13
Serve as officer or on committee of society	17	20	14	11	12	10
Use "P. E." after name	3	3	2	0	0	0

"Summing it all up, how important do you personally feel it is for engineers to have a thoroughly accepted status of professionals in their company . . . ?"

	Engineers			Managers		
	Total	A Cos.	B Cos.	Total	A Cos.	B Cos.
Very important	65%	71%	60%	64%	64%	63%
Fairly important	26	21	30	27	32	24
Not too important	8	7	8	7	0	13
Other, no opinion	1	1	2	2	4	0

better communication to an investigation of economic factors. Both managers and engineers saw many similar actions as steps to improving the profession, although they placed different importance on each item.

In general, the survey serves to point up the fact that engineers can best advance the cause of the profession by doing things which make them better qualified engineers. Primarily this has to do with technical qualifications, but related to this are work attitudes, communications ability and integration with the company as a whole.

Managers can best advance the cause of professionalism by seeing to it that engineers' efforts are applied in the best possible work environment with proper recognition of achievement. Both groups can do much to promote two-way communications. The key to the problem seems to be employee relations.

The Professional Engineters Conference Board for Industry is composed of leading industrial executives and was established to inaugurate and guide a program of research survey questionnaires. The final reports result from the surveys. Present chairman of the Board is W. K. Adkins, P. E., chief engineer for the Firestone Tire & Rubber Company, Akron, Ohio.

Surveys done by this group in the past have included: *Career Satisfactions of Professional Engineers in Industry*, 1957; *How to Improve Engineering-Management Communications*, 1952; *How to Improve the Utilization of Engineering Manpower*, 1952; *How to Attract and Hold Engineering Talent*, 1954, and *How to Train Engineers in Industry*, 1955. The present survey will be available in full soon from NSPE.

Need for Creative Freedom

The PECBI report is in the process of being published, and will be ready for distribution during December. A handy order form will be included in the December AMERICAN ENGINEER for your convenience.

This view of an Eastern coast city shows the typical unplanned grid of mixed land uses, ignoring physical land characteristics. Traffic movement is not defined; all roads are of equal importance, regardless of flow.

The Engineer's Problems in City Planning

By

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Yesterday's Mistakes Plague Today's Leaders

Most American cities have been developed on the grid plan. This concept, frequently devised by civil engineers at the demand of the city fathers, is characterized by streets all the same width and blocks all the same dimensions. When the city needed to be enlarged, the city surveyor simply added another block or two to the already existing grid. The streets and blocks were seldom arranged according to function. Today in many cities they are even less likely to be related to present occupancy and use. All too often the grid plan completely ignores the contour of the land.

This is the kind of situation that the city engineer may have inherited with his appointment. As a direct consequence of a lack of proper planning, he finds himself beset by many signs of inadequacy, of which traffic and parking problems are only a part. Too narrow sidewalks, no room for children to play, safety hazards and dangers from fire—these are the symptoms that have become so obvious that even the least civic-minded can recognize them as today's heritage from an unthinking past.

The present day city engineer can scarcely be blamed for what he has inherited. His city was already built; he has had to work with existing conditions. Too many of the concepts and plans were instituted blindly without regard for the people they were to serve. And when plans are not made with human occupancy in mind, they break down under peak conditions and ever changing cycles.

Today's cities suffer from being simply outmoded and inadequate to meet current occupancy requirements. The symptoms of this condition are called "blight," a decadence with many forms. Slums and dilapidated property are obnoxious signs of blight but there are others that advertise the declining neighborhood. The card in the window saying "Room for Rent," the two or three doorbells appearing on what was previously a one-family house—these clearly indicate a trend toward tenement conditions.

Poor garbage pickup and lack of community cleanliness are other definite clues of the need for better planning. Inevitably there will fol-

low a decline in population. For example, the high-school graduate may leave in order to obtain better work opportunities. Such conditions as these do not indicate the growing, healthy town. And when the city finds that there are more appeals against its zoning board than there are acceptances, that it is unable to raise school bonds, that it operates in the midst of climbing taxes and public apathy, then the city engineer should realize that his city is on the downgrade.

Yet many of these problems can be solved by close cooperation between city engineer and city planner, together with a high rate of citizen participation. To achieve this, the city should form a commission for civic improvement, with representatives from professional, industrial, business, religious, and social groups as members. And above all the city engineer should be a member of such a commission. The representation of all factions in the living city will automatically point out all areas of survey and will create accurate evaluation of the needs. The engineer becomes a correlator at this stage.

First of all, the city engineer knows his city in a very real and practical sense; therefore he can best collaborate with the city planner in adding up the balance sheet of the city. He can state the debits, inadequacies, and potential trouble spots because he knows and understands the city from a day-to-day familiarity with its operations. In addition, the city engineer can help the city planner forecast areas for use of new land as well as re-use, and determine the validity of function of the land, of water supply, and treatment of sewage and patterns of road usage.

In short, the city engineer can supply a great wealth of subjective knowledge because he knows the problems firsthand. Furthermore, as a professional man, he enjoys the respect of the community, the confidence of local citizens, and he can intelligently advise the city planner in the ways of the city.

The city planner, the person with whom the city engineer will work, has been prepared by background and training to construct a master plan for orderly growth for the city. City planners are frequently either architects or civil engineers who have had graduate training in the specialty of urban planning. Some planning firms, for example, hire all types of engineers as well as landscape architects and economists because they believe that by drawing from several disciplines they are best able to formulate a realistic, practical design for living. City planners are, after all, not men of one profession but coordinators of all.

Whether he was originally architect or engineer, the city planner works in very real and practical media. His job is not to propose a grandiose scheme for building and spending millions of dollars, but rather to initiate a pattern of orderly development for human occupancy. City planning does not deal in futuristic ideas with little, if any, application to present-day demands. City planning is talking about children and their parents; and schools, parks, and playgrounds are just as much a part of planning as are streets and shopping areas and capital budgeting.

The city engineer should expect the city planner to work closely with him and the other city officials, especially in the early stages. He will see that the city planner

Shown above is a neighborhood outside Helsinki, Finland. This depicts part of a total master plan with an organized land use pattern, geared to physical features of the land. Traffic roads are graded in importance of use and the main highway bypasses the dwelling areas.

City planning gets top priority in on-the-move Pittsburgh. Here is an aerial view of the downtown area which shows route of Fort Pitt Tunnel under Mount Washington shortly after construction began in 1957. The Golden Triangle, the city's main downtown area, is in background. The toll-free tunnel, now completed, was the final link in Pittsburgh's 25-mile Penn-Lincoln Parkway.

approaches the management of the city as a business, that he will first conduct an independent city-wide survey. The city planner will observe the people and the children. He will want to see the facilities for road improvements, water purification, and city sanitation. This survey is of major importance for on it the city planner will base part of his master plan. The more closely the city engineer and he work together during this period, the more comprehensive and real will be the plan.

When the survey is finished and the master plan begins to take shape, three distinct areas of classification appear. The city engineer must be concerned and involved with each.

The first classification is one of conservation. The city must conserve good areas of the community. Citizens must be encouraged to prevent blight, and the city engineer must do his part to insure effective performance of municipal housekeeping functions and adequate community facilities. Carrying out this conservation plan involves suitable land use and strict enforcement of housing and related laws.

Preservation and conservation of the heritage of the city on traditional, historical, emotional, and aesthetic grounds are important. For just as a community consists of young and old people, so it should consist of young and old buildings to give it a sense of depth and balance. In business or industry, this program would be equivalent to taking care of and protecting all the assets at hand.

The second classification deals with rehabilitation of land uses and buildings that, in some cases, are beginning to deteriorate because of decadence in the use or in the design of the building. Preventing the causes of blight and removing the symptoms in accordance with an urban renewal program requires that all inadequate and substandard structures be remodeled, repaired, or altered to make them adequate for present-day needs both in design and in the zoning which controls their use. The city engineer must help the planner carefully evaluate all buildings that do not meet the demands of current times. The biggest proportion of the city's buildings will fall into this second category. Admittedly it would be fine to tear down almost everything that suffered from some degree of inadequacy, but realistic acceptances of present-day building costs and capital budgeting will strictly curtail the amount of renewal possible, despite federal and state aid programs.

Totally inadequate structures that do not meet minimum use and health standards will come under the third classification of renewal. This deals with slum clearance and redevelopment of area. The process of demolishing substandard areas, of clearing sites, and making land available for whatever purpose that might be served under a new land use plan will call for redevelopment by private or public agencies either under federal grants, cooperative programs, or the complete resale of land to the private developer.

All three categories must naturally conform to the over-all master plan. The engineer's role in this more drastic phase of planning lies in the practical relationships of bringing in or redesigning roads and associated utilities. He will

(Continued on page 53)

About the Authors . . .

Prof. Burdis

Mr. Mayfield

J. F. C. Burdis was educated at King's College, Durham University, England, as an architect and city planner, and worked on the English post-war planning development for County Master Plans and Rehabilitation Programs. He is presently an associate professor teaching city planning at Rensselaer Polytechnic Institute. In addition to teaching he has acted as a planning consultant to the Veteran's Administration and operates his own business in Albany, N.Y.

Walter P. Mayfield, Jr. studied biology and chemistry at the University of Alabama before taking his master's program in technical writing at Rensselaer Polytechnic Institute. Before coming to Shawinigan, he was with the Department of Language and Literature, Rensselaer Polytechnic Institute.

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

Manpower Problem ►

Come what may on November 8, the next administration is going to be bedeviled, as has been the present administration, with the manpower problem, both in general and in particular as regards the engineering and scientific force of the nation.

During the campaign the candidates spoke often of the manpower problem, and with emphasis on the training of engineers and scientists vis a vis the Russian output of technical specialized skills. Whether these expressions of concern will be translated into some form of legislative action will not be known for at least several months, but there is certain to be renewed demand for Federal programs in the general manpower area, related also, of course, to suggestions for additional action on various proposals in the over-all educational programs.

Meanwhile, although Congress is in recess until January, there have been continuing developments of interest and importance in the engineer-scientist field of manpower considerations.

◄ Defense Contractors

Representative James C. Davis of Georgia, chairman of the House Subcommittee on Manpower Utilization, has long taken a special interest in engineer-scientist recruiting costs of defense contractors. In 1956 and 1957 the Davis group released figures showing the high recruiting costs paid for by the Federal Government through reimbursement of contractor costs in most cases, and by the same source indirectly through the cost of defense products and services.

Now the Subcommittee has issued a further study based on a sample survey of 102 defense contractors. The new findings continue to show a significantly higher recruiting cost for defense contractors compared to those companies whose business is predominantly commercial. Of 76 companies which had more than 50 per cent of their business with the Government the average recruiting cost was $1,022 per engineer or scientist. Of 26 predominantly commercial firms the average was $751.

The report says that the defense agencies have made some progress in controlling recruiting costs through more stringent regulations. But it is noted that the Armed Services Procurement Regulations have never attempted to establish quantative standards as a means to govern the allowability of recruiting costs. The agencies rely upon "reasonableness" in allowing such costs, both as to recruitment and pay of professional personnel. Another important aspect of the study relates the recruitment cost factor to the turnover problem among engineers and scientists. Here, however, there is no noticeable difference between defense and commercial firms. The separation rate by per cent by agencies is as follows:

	Defense	Commercial
Army contractors	21.6	14.0
Navy contractors	5.4	12.9
Air Force	10.6	14.1

Chairman Davis commented upon issuing the report that excessive personnel turnover detracts significantly from the effective utilization of scientific and engineering talent in the defense effort. Also, he called for more attention in negotiating contract costs and in specific auditing by the military departments. The high recruiting costs, Representative Davis added, "also clearly indicate that the companies concerned have not made proper use of the free public employment services provided by our Federal and State Governments."

Employment and Manpower ►

"Manpower Problems of the Sixties," was the theme of a hearing before a Senate Subcommittee on Employment and Manpower shortly before Congress adjourned. Some of the comments made at that hearing will raise a few eyebrows among engineers as indicative of the lack of awareness by some legislators of the relative importance of engineers in the technological manpower complex. Example—Senator Clark of Pennsylvania opined at one point, "Also, I would give emphasis to the thought that the engineer is the fellow who carries out somebody else's bright idea. There may be a real need for research and development scientists, rather than engineers." Senator Prouty of Vermont readily agreed with the observation.

Dr. Frederick H. Harbison, director, industrial relations section, Princeton University, tried to put that portion of the discussion into proper perspective by noting:

"I think it is a mistake to think in terms of engineers as all engineers alike.

"We are, certainly, short and always are going to be short of highly creative, very imaginative engineers and scientists, the very small proportion of the total number of engineers. Therefore, we have a quality problem of finding ways and means of getting that very small number of persons that my colleague, Douglas Brown, referred to as the 'seed corn' resource—really, the exceptional people of high creative activity. This is one problem that you have to consider in interpreting whether it is 30,000 or 50,000 engineers that we might need a year hence. It is a very qualitative decision that has to be made."

The witness alluded also to the waste of engineers on jobs that could best be performed by engineering technicians. Senator Yarborough of Texas pursued that point, noting that in the United States most of the technical work in industry is performed by engineers, whereas in the Soviet Union up to 90 per cent of the same work is performed by technicians rather than engineers. Dr. Dael W. Wolfle, executive officer, American Association for the Advancement of Science, responded "it must also be remembered . . . that we are using the term in a different fashion. The European engineer who is entitled to use that term legally in Denmark or in Norway or in Germany, or other countries, has a training substantially better than the average engineering graduate here. He is supported by assistants, sometimes by two or three groups of people, practical engineers or engineering technicians." Later he added, "When you give the title 'engineer' to the person who flunked out of engineering school at the end of his sophomore year and went to work, and then acquired that job title, it becomes very difficult to say how much is waste."

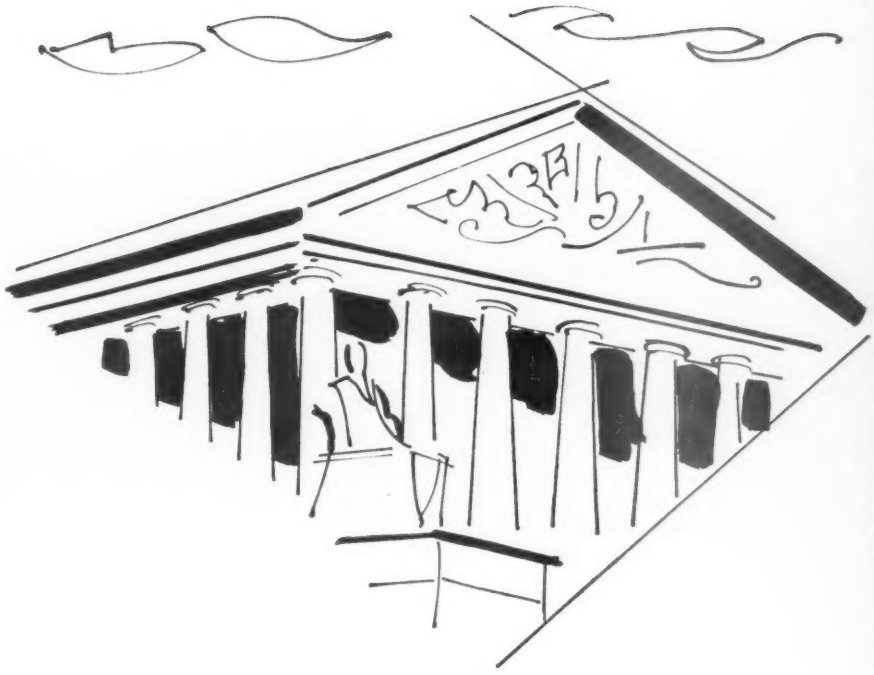
◄ National Science

The National Science Foundation estimates that total funds for the performance of basic research in the United States reached a level of $1 billion in the year 1959-60. The NSF study indicates that basic research funds rose from about $430 million in 1953-54 to more than $830 million in 1957-58, an increase of 93 per cent. Throughout this period, funds for basic research continued at a level of about eight per cent of the total estimated R&D funds. Total R&D funds in the United States reached a $12 billion annual level for 1959-60, according to NSF.

Of 1,491 National Defense Graduate Fellowships recently awarded, 36 percent are in scientific and technical fields—16 per cent in the physical sciences, 10 per cent in engineering and 10 per cent in the biological sciences. The fellows were selected on the basis of recommendations made to U.S. Commissioner of Education Lawrence G. Derthick by 136 colleges and universities. The National Defense Education Act authorized the Office of Education to award 1,000 fellowships in the academic year 1959-60, and 1,500 in each of the three succeeding years.

It is generally expected that an effort will be made to increase the number of fellowships authorized in the NDEA when that law comes up for review in the next Congress.

By
STANLEY S. PAIST JR.
Power Engineer
Rohm & Haas Chemical Company
Philadelphia, Pa.



Practical Ethics For The Professional Engineer

DISCUSSIONS of ethics are provocative. This inherent characteristic may account for the fact that this subject is avoided wherever possible. The oft-repeated advice to avoid discussions involving religion, politics and women might have included ethics, but ethics are so basic that any discussion of the taboo subjects would most certainly drag ethics in by the heels.

In our country, with its unique form of government, and in our Society, individual beliefs, individual effort and individual action are essential. We are currently endangered by the ever growing tide of massism in thought. The larger and louder derisive chant of those who find safety only in numbers is a cancer that cannot be wished away. Its growth will be arrested and, finally, cut out only by individualism.

Ethics are basic guides for individual effort. They shape human behavior. Such fundamental bases cannot be avoided and they cannot be ignored. They should never be influenced by expediency. They should always be based on ideal human behavior. Our experiences, our intuition and our formal knowledge combine to form the wisdom from which arises our definition of ideal human behavior.

Without ethics or our definition of ideal human behavior, we would be free to follow our slightest whims. Because the desire for freedom is an inherent human characteristic, we all wish to act unfettered by any moral or physical laws. However, we all have built into us a sense of right and wrong, conscience or instinct if you prefer, that gives us a sense of balance. Even when we will not publicly admit a wrong action, the error is quietly recorded in our in-

(Please turn the page)

most senses. Although we suffer "pangs of conscience" when we act in opposition to these instinctive feelings, we are human enough to plunge along and are sometimes misled by short term gains. Lack of knowledge or suppression of our insight often closes our eyes to the long term loss.

Individualism is emphasized. How can we retain individualism if we are all bound to the same ethical code? This is an admitted antithesis. It is solved when we agree on the ethical code by individual action. If you believe a part of the code is wrong, try to get it changed by orderly revision. Don't pick up your marbles and go home. Don't think that it is useless to petition for change because "everyone's against it." The great ideas of philosophy and the great acts of history did not, we can be certain, come from a majority. In fact, many of these were accepted only after much debate and trial. The lucid idea of a gifted mind often requires a patient, and sometimes painful, approach until others, less gifted, overcome their prejudices. In this instance, the word "prejudice" means being down on something you are not up on. Once you get "up" on something, it often has a disquieting way of being all right.

If we attempted it, you and I could probably not get a mutually agreeable code of ethics. This should not surprise any of us, however.

There is a tangle of ethics because of an unavoidable, confused ethical heritage. Consider the following list of complex cultures we have in our past[1]:

- The Hebraic culture, based on the Ten Commandments with emphasis on the group in total "covenant."
- The Christian systems, based on the Beatitudes, the Sermon on the Mount, with emphasis on the redemption of the *individual* through the fact that God reconciled himself to man.
- The Renaissance culture, based on the *individual* and his freedom.
- The Industrial Revolution, based on the technical application of science to production and distribution.
- The Scientific Revolution based on fundamental natural laws and the correctness of these natural laws.

Each of these cultures or systems had and, in some cases, still has its characteristics. Each produced a different kind of individual and society. All have occurred within a few hundred years.

Examine some conflicts, or tangle of ethics, in cultures which are very much alive in us today. Try placing the ethics of ambition, prestige, success and profit motive

Our ethical heritage has evolved from a long series of complex cultures in our past.

which were bred in the Industrial Revolution with its quantitative, mercantile evaluations, alongside of the Beatitudes where the meek are blessed. Here is a conflict which must trouble many thoughtful people.

We are just beginning to discover cultural habits and ethics of oriental systems. The oriental art of staying away from extremes and striving always to be at the center is beginning to have some effect on us and our desire to compromise, even if the truth may point toward an extreme. Our culture and ethics are constantly yielding to change under a combination of factors which, themselves, remain unstable and shifting. It is easy to imagine the derision that would greet certain customs of behavior that were popular 50 years ago. When an engineer, living in this stage of civilization and with this kaleidoscopic ethical background, tries to define his ethics, he has a much more difficult task than is generally assumed. First he must decide which set of ethics he will employ. He then must attempt to dovetail all conflicts. Finally, he must be prepared to change his base in an orderly and progressive manner as new demands are made by an unstable and continually shifting culture.

For example, all he has to do is (and this expression generally means we don't know the complexity of the factors involved) take the Christian ethics embodied in the Beatitudes and the Sermon on the Mount, dovetail these ideas with those spawned by the Industrial Revolution and then change the result with the new demands made by the Scientific Revolution and ICBM's. Not an easy job.

The Pennsylvania Society of Professional Engineers has a code of ethics which was drawn up before the Scientific Revolution was old enough to have any influence. However, we must assume that this code grew out of the remaining tangle of ethics which has been recounted. We should agree that this code must be kept up to date as our ideals and culture change. The knowledge that makes us thinking, free individuals will enable engineers to alter their code of ethics in a fruitful, orderly and progressive manner.

The Pennsylvania Society of Professional Engineers and the National Society of Professional Engineers have the booklet *Ethics for Engineers.* This booklet is important for two reasons. In its introduction it gives the history of current engineering ethics and, incidentally, remarks on the changes that have taken place in this area. Secondly, it gives definite, applicable Rules of Professional Conduct as practical guides regarding the intent of the Canons.

The Canons are important bases but they are general statements of intent. They are in effect—"against sin." The Rules of Professional Conduct, reworded and compiled, over the two-year period from 1955-1957, from the source information of many engineering societies, put definitive, regulatory, teeth in

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1—From "The Tangle of Ethics" by Samuel H. Miller, Harvard Business Review, January-February 1960.

the Canons so that a better delineated "bite" may be clamped on offenders.

Although the booklet *Ethics for Engineers* is a principal resource for judging alleged unethical actions, it is not the only reference used by PSPE State and Chapter Ethics & Practice Committees who must deal with practice violations as well as ethical ones. Other Committee references are:

- State Registration Law including all pertinent legal opinions that have been handed down from cases tried.
- Pennsylvania Society of Professional Engineers Charter because its by-laws contain the rules which prescribe the methods to be used and the final punishment to be accorded members who violate adopted ethical standards.
- Local chapter charters because PSPE is a "grass-roots" type of organization and local chapters have jurisdiction in their own areas although their charters must be approved by the state. This local freedom of action has its advantages but it can be disadvantageous when certain chapters act independently in different directions and out of accord with the best interests of the whole. Here is another illustration where individual thought and effort are of consequence. In this instance, a sound appraisal would show that individual chapters should abide by the will of the majority until they can, by persuasive argument and orderly revision, change the base to a more desirable one.
- National Society of Professional Engineers *Professional Policies* because we need some over-all guides to help state and local chapters work inside a loosely federated system. In the same manner, local chapters are loosely joined by the state system.
- Pennsylvania Fee & Salary Schedule because an engineer's pay is an important item and a controversial one.
- Ethics & Practice Committee Chapter Handbooks because, in Pennsylvania, we are trying to set down in writing the procedural rules which should be used by all chapters to guide the efforts of their Ethics & Practice Committees. We believed that if a published standard existed, it would be used. Currently, there is some reason for disappointment because there is not more uniformity among the local committees in their procedures. Incidentally, the National Society is amending an NSPE handbook which they hope will provide procedural uniformity among the states.

The six references itemized above, plus *Ethics for Engineers,* provide seven references which are, currently, what should be used to judge ethics and practice violations in PSPE. These references are not perfect. In fact, some have been in existence such a short time that experience has not rubbed off the rough edges. However, they are a start and, as such, they are a bulwark of our Society. We should welcome a searching discussion of them. We should hope all engineers profit from their use. It is most important that all engineers are sufficiently interested in them to be guided by them where they are sound and to petition for their revision where change is considered reasonable. It may be, as the number of industry-employed medical doctors and lawyers grows, that the professional engineering codes will become a prototype for these employed professionals also.

Now, it might be well to illustrate the difference between *ethics* and *practices.*

The foregoing, dealt primarily with ethics only. Practices are easier to handle than ethics because practices are defined by law, the State Registration Law in Pennsylvania. Mal-practice cases, and there are over 220 currently being investigated in Pennsylvania via our PSPE state headquarters, have generally a "black and white" aspect. They occur exclusively, between engineers and the public. Ethics violations are much more difficult to assess and prosecute because they are not determined by a law, because they usually occur in the much more explosive and contentious realm of engineer versus engineer and because they have a "grey" aspect unlike the "black or white" aspect of the practice violation.

For a typical case involving ethics, consider an advertisement in a classified telephone directory which is two columns wide, 2 inches high and contains this phrase in bold face type—"Sound, Low Cost Structures Start With Good Design. We may be able to save you future worries and needless expense through proper design and supervision of construction."

How does this comply with Canon #2 which states, "He will not advertise his work or merit in a self-laudatory manner and he will avoid all conduct or practice likely to discredit or do injury to the dignity and honor of his profession?"

How does this comply with that part of Rule #5 which reads, "The substance of such advertising shall be limited to fact and shall contain no statement or offer intended to discredit . . . another engineer . . . by implication." Can this engineer save money where another engineer cannot?

Or consider Rule #6 which states—"Telephone listings shall be limited to name, address and telephone number under each branch listing in which he qualified."

Shall the Ethics & Practice Committee involved tell this registered engineer that his advertising, which presumably he has used for many years, is not circumspect? That is unethical, and unless he changes it PSPE action will be taken to drop him from membership and petition the State Registration

(Continued on page 56)

About the Author . . .

Mr. Paist

Stanley S. Paist Jr., P.E., graduated from Lehigh University with a B.S. in electrical engineering in 1937. He has been employed for the last sixteen years by the Rohm & Haas Chemical Company in Philadelphia and is currently power engineer. Mr. Paist has been a registered professional engineer and a member of the Philadelphia Chapter of PSPE since 1946. In that time he has served on the Ethics and Practice Committee for three years. Currently he is a director of the Philadelphia chapter, chairman of the State Ethics and Practice Committee and a member of Tau Beta Pi.

The Failing of The Malpasset Dam:

A Close Examination of the Engineering That Preceded A Baffling Disaster

THE disastrous flood and large loss of life which occurred at Frejus, Southern France, toward the end of 1959 when the recently completed Malpasset Dam failed, emphasizes once again the tremendous responsibility which rests with the engineer and his work.

A provisional report has now been issued by the Committee of Inquiry set up by the French Ministry of Agriculture. Later a full report will be issued giving the conclusions of the Committee on the failure of this concrete arch dam, which was described when it was completed as the thinnest dam in Europe.

Site investigation after the failure showed that the concrete blocks forming the base of the dam had been well bonded into the foundation rock. It was found that even those sections of the dam which were moved carried with them pieces of the foundation rock, the two still being bonded together.

Some of the concrete from the bleached wall had been carried for a distance of as much as 450 ft. and pieces of this concrete were tested for compression and tension and found to be satisfactory. The strength of a construction joint was also tested and it was found to have developed a satisfactory strength.

Records showed that regular tests on the concrete strength were made during construction and that the quality of the aggregate used was satisfactory.

Concrete placing was carried out, block by block, in successive lifts and nothing was found to have been done which varied from the normal constructional methods.

The cause of failure was not found to be overflowing and subsequent undermining of the downstream face because the dam did not overflow.

Severe vibrations from discharge

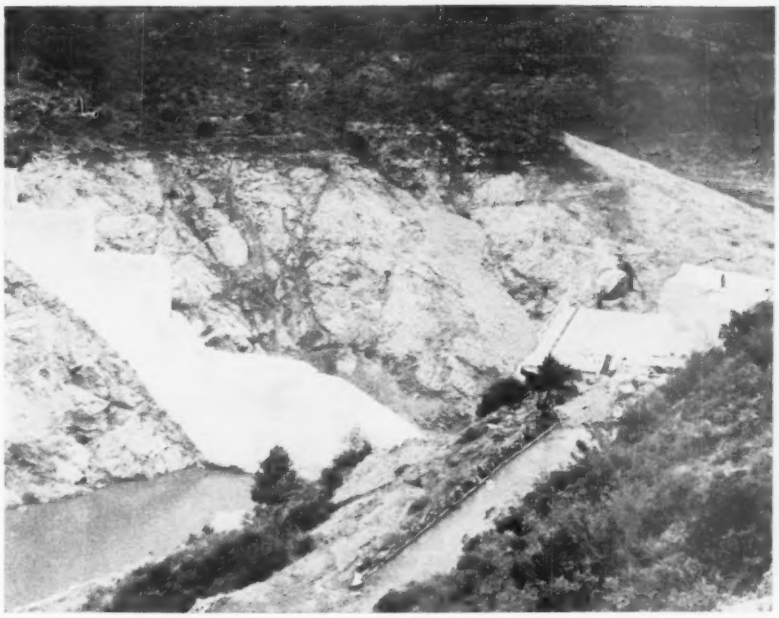
Robert Buron, left, French public works minister, and two engineers examine broken Malpasset Dam which crumbled, flooding the French Riviera town of Frejus in the Reyran River Valley. The inspection followed government orders to investigate.

valves have been known to occur when these valves are insufficiently aerated on the downstream side. Three hours before the dam failed a discharge valve was in fact opened but severe vibration was not felt. It was felt that as some twenty previous operations of the valve had been made without incident this could not be the cause of failure. The discharge from this valve was also found, from photographic evidence, to have been correctly directed onto a concrete apron. Previous operation of the overflow confirmed the view that the slipping of the left bank which was noted was not caused by erosion from the jet.

It had been advanced that the failure of the dam was caused by seismic disturbance but investigations revealed that there had not been any earthquake shocks in the days preceding the failure. Microseismic phenomena was also not considered to have any bearing on the collapse of the dam.

Sabotage had also to be considered as the means of destruction of the dam. A large quantity of explosives would have been required to cause instantaneous failure of the dam and it was not thought possible for such an amount of material to have been placed in position without being detected.

The reservoir keeper reported that at the collapse he heard a succession of cracks and immediately afterwards there was a flash, caused, it is considered, by the released water. It is not likely, states the Commission, that the failure of the dam was caused by a meteorite because in that case the flash would have preceded the failure by cracking.



View of the ill-fated Malpasset Dam after it burst on December 3, 1959, causing hundreds to be killed in the ensuing flood.

Observation of the dam after the collapse showed that substantial movement of the left abutment had taken place. There was movement of most of the remainder of the dam with the exception of the extreme right bank. This leads the Commission to the conclusion that failure of the rock below the foundation of the dam led to the destruction of the dam.

It is now the object of the Commission to find out exactly why this movement took place.

The rock below the foundation was grouted to ensure watertightness although the take of the grout was very small. Generally speaking the foundation rock was impermeable which might have hindered any accidental flow and led to under pressure. On the other hand a certain number of faults in the rock might have assisted infiltration. There were other factors which the Commission considered might have assisted infiltration. First, construction of a nearby highway had involved blasting. Secondly, movement of the dam which was exposed to the rays of the sun in its upper part and which expanded more because the reservoir was not as yet filled. Thirdly, the heavy rainfall in the days just before the disaster might have formed cleavage channels beneath the dam.

Future investigation work planned at the site of the dam is the driving of a tunnel into the rock below the left abutment. Seismic investigation is also to be carried out into the nature of the rock upon which the ill-fated dam was founded.—**End.**

Meetings of Note

American Institute of Industrial Engineers — Regional Conference, Nov. 3-4, Boston, Massachusetts.

American Institute of Electrical Engineers—Fall Textile Conference, November, Raleigh, North Carolina.

American Society of Mechanical Engineers—Annual Meeting Nov. 27-Dec. 2, Statler Hilton Hotel, New York, New York.

American Institute of Consulting Engineers—Annual Dinner, Nov. 29, Waldorf Astoria Hotel, New York, New York.

American Institute of Mining, Metallurgical and Petroleum Engineers—Electric Furnace Conference, Nov. 30-Dec. 2, Morrison Hotel, Chicago, Illinois.

Students often consult with other faculty members and consulting engineers in the city. Prof. John Martinez, right, is shown discussing a problem in materials with S. X. Zanca and D. R. Giblett.

By

CHESTER A. PEYRONNIN, JR., P.E.

Associate Professor

Tulane University

TEACHING PROFESSIONALISM

One of the most important problems in the field of engineering education is that of providing a bridge between the theory of the classroom and the art practiced by the professional engineer. Many times students fail to understand how the many courses studied are combined in the solution of engineering problems. A student will take courses in fluid mechanics, thermodynamics, electrical theory, mechanics of materials and the like, but never put these fields together in any problem. Usually there is a "design" course in the senior year in which the student is exercised in certain technical phases but all too often these courses do not provide the unification required. Professional ethics and problems are often dealt with in seminar or non-credit courses and very little exercise is given in the actual management of a project. One solution to this problem is found in a new plant design course in the revised mechanical engineering curriculum at Tulane University.

This course was conceived to accomplish three objectives. First, it was to provide a unifying course in which students would be required to combine knowledge in different fields to produce a finished design. Secondly, it was to provide an experience in the creative solution of problems without the formal guidance usually given to classroom problems. Lastly, it was to provide an insight into professional practice with emphasis on ethics, engineering arts, and project management. Since the National Society of Professional Engineers is actively interested in the last facet and since many of the ideas presented were influenced by society thinking on professional practice, this article will present some of the highlights of this course.

This course is a departure from the typical lecture, laboratory, or computation course in that the structure of a small engineering organization within a larger organization is simulated. The class is organized in groups of approximately ten students. One is designated as chief engineer. Under him are three project engineers who supervise several design engineers depending upon the size of their problem. These positions rotate throughout the semester so that each student functions in some position of responsibility. Each chief engineer will set up his own organization and assign portions of the work to them. He makes out a work schedule and assignment sheet at the beginning of his tour. At the end of two weeks he is required to submit a progress report and a promotional rating on each of his project engineers. Each project engineer will likewise rate the men working under him. The faculty member assigned to this class will act as liaison between this group and any outside "customer" or other section of the organization. Other faculty members are frequently called upon as consultants in their special fields and any project engineer may consult them after obtaining approval from the chief engineer who first satisfies himself that they have need of outside help.

Every two weeks there is a staff seminar in which special problems are discussed so that students who didn't work on some phase of the problem profit from the knowledge of others. In this period members of the groups are required to defend their designs or clarify their

Work progress is checked at conferences, in which the students are required to explain and defend their results. L.-r.: L. C. Grundman, the author, E. F. Alline, D. L. Hall, and L. E. Cole.

presentations and in turn receive criticism or comment upon their work. The success in bringing this management phase home to the students can best be illustrated in a light vein by the often heard remark "if we didn't have so much paper work we could get the design finished."

The class meets formally for one lecture period and two calculation periods a week but the students are required to be present only at the beginning of the calculation periods in order to check in with their supervisor. The class meets in a special room that is used only for this class and contains a small professional library of catalogs, and manuals and manufacturer's literature. Thus the students operate as if they were in their own office building. The actual hours spent in the course are far above those required but there has been but little adverse criticism from the students. It seems as if they enjoy being set free, so to speak, and will willingly work many hours on their own once they start a problem. Since the problems allow a wide choice of assignments there are few instances of students working in areas which do not interest them. It is this interest that makes this course successful.

Formal lecture work is kept to a minimum. The few lectures that are given are directed toward the application of theory rather than the presentation of new theory. Lectures are given by topics and not paced by the normal classroom hour but continue until the subject is covered and all questions are answered, even if it means using up a portion of the calculation period. Part of this is done to impress upon the students that engineering project accomplishment cannot always be tied to a forty hour week but rather must be paced to a task that must be finished in a given time.

The lecture series begins with lectures on proposals and contracts, customer relations and ethics of the profession, mandatory and discretionary codes, planning procedures for design, production and construction schedules, office problems and drafting procedures,

Shown is the Mechanical Engineering Building, Tulane University, New Orleans, La.

human engineering and safety, plant site selection and layout. Application lectures on foundations, piping, pumps, vessels, electrical motors, controls and wiring, and machine design are included. Many problems that arise during the course are discussed in informal lectures or in the staff meetings. One of the most spirited discussions always come during the session on ethics. The students become aware of their responsibility and are very serious about wanting to elevate the standards of the profession.

The major emphasis of the course is on problem and design work. The problems are quite different from the usual textbook problems of years ago. Each problem is chosen to illustrate a different facet of engineering with a minimum of effort but a maximum of individuality. There are several small assignments and then one major problem. In each problem the students are given only the general requirements, customer desires, and required extent of presentation completeness.

The first problem will usually be a code problem to acquaint the student with the terminology and organization of various codes. One problem would be to design a fuel storage facility for a given quantity and type of fuel. Here the student must consult the National Board of Fire Underwriters codes and local building codes. He must prepare the drawings plus a list of mandatory requirements and certain discretionary improvements that he wishes to make.

The students work in teams with members assigned to various phases of the work on a rotational basis. L.-r.: L. E. Cole, L. C. Grundman, E. F. Alline and D. L. Hall.

The second short problem will be one dealing with the use of professional and manufacturer's literature as aids in the solution of problems. For this problem the student is usually assigned a piping problem to be designed in accordance with the American Standard Code for Pressure Piping but using a piping manufacturer's forms for the flexibility analysis. This generally consists of two vessels which must be connected by a suitable pipe for a given service. The student has a wide choice in designing the system but is required to design for minimum stress in the hot condition.

The third problem is usually a creative problem involving some process or mechanism. One example of this would be a device to mass produce figurines made from Plaster of Paris. The students must go into the laboratory and determine the proper mixture, allowable hold time, setting time, and maximum drop distance in the extraction procedure. He must then devise a machine that will mix the plaster, inject the mix, and remove it from the mold when dry. Finished drawings are required for this device.

Another in this series is a water sampler to remove a one quart sample of water from a stream every hour for a twenty-four hour period. The sampler must take a true sample including sediment, and must be portable, capable of operating on 110 volt a.c. or d.c. battery power, and must be completely self-cycling. Here the students in mechanical engineering have to study sedimentation to insure that the design will meet the requirements. Only these broad instructions are given the groups. Preliminary designs are checked frequently in order to prevent the group from going too far astray at the beginning. Complete material specifications must be written for all major components. An alternate set of problems in this field consists of requiring the students to devise or plan a device that will sell in the price range of five dollars with a manufacturing cost of only one dollar for materials or purchased components. This means that they will plan on a product in the novelty, automotive gadget, or household gadget field. Once they have produced an idea they must have it reviewed by another student who will make a market survey of ten people to determine the feasibility of the idea. Some of the ideas submitted in the past were very good and could be marketed.

Once the students have com-

(Continued on page 58)

About the Author . . .

Prof. Peyronnin

Chester A. Peyronnin Jr., received his B.S. in mechanical engineering in 1947 from Tulane University, and his master's in 1950 from the Illinois Institute of Technology. Presently an associate professor of mechanical engineering at Tulane, he has worked several years in industry. A former editor of the *Louisiana Engineer*, he is a member of ASME, NSPE, Tau Beta Pi, and Alpha Lambda Sigma.

Professional Profiles

Miss Carolyn Maffetone, secretary, hands a letter from the National Council of Engineering Examiners to Charles C. Bonin, stating that he has largest known number of engineering licenses in United States.

A recent check by the National Council of State Boards of Engineering Examiners, Clemson, South Carolina, has revealed that the nonexistent title of "Most Registered Engineer in the United States" should be awarded to Mr. Charles C. Bonin, engineering manager of Ebasco Services Incorporated, New York City. Mr. Bonin now holds 51 state engineering licenses for the United States and its possessions, including Puerto Rico, the District of Columbia and the Canal Zone. This is the highest number held by any United States engineer whose record is on file with the National Board.

In his position as engineering manager of Ebasco, Bonin has many occasions to make use of the certificates issued by the various states. Ebasco's operations have been conducted in nearly every state, as well as in over 15 countries abroad. Mr. Bonin supervises the work of over 300 engineers and more than 500 draftsmen and designers, who are carrying on as many as 68 major projects at one time.

Getting all those licenses was not an easy task. While many states award engineering registration certificates on a reciprocal basis, several make it necessary to take an examination, written or verbal, or to appear before a board and answer questions on a variety of engineering subjects. When you're more than twenty years out of college, examinations aren't too easy, particularly when you're not sure even what type of question will be asked, says Mr. Bonin.

Mr. Bonin is a graduate of Worcester Polytechnic Institute, where he received a B.S. degree in civil engineering. He later received the professional degree of civil engineer from WPI for his thesis on the Northwest Power Pool, which he helped organize during World War II.

If other countries should require registration of United States engineers, Mr. Bonin would be able to add several to his impressive list. He is particularly well known in Japan, where he directed the operations of overseas consultants and Ebasco for five years immediately after the war, and where he was directly responsible for design and construction of the Kamishiiba arch dam, first arch dam ever constructed in the Orient. Since that time, Ebasco has carried out a number of steam electric stations in Japan. He also is well known in Italy, where work is going forward on the SENN Project, a 160 mw boiling water nuclear power plant.

The airlines also have granted Mr. Bonin special recognition, as he is well past the 2,000,000 mile mark in airline travel, including fourteen trips around the world.—**End.**

New Literature

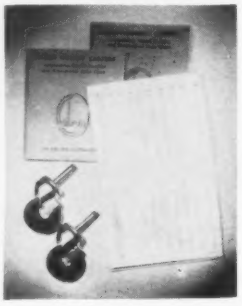
CORE DRILL—The Acker Presidente, a new core drill rig designed for rugged field service, very deep core drilling and versatile operation, is described in a 6-page illustrated folder, bulletin 31, available from Soiltest, Inc. The Presidente drill is designed for use in civil engineering testing work in soil sampling and rock coring; in mining and mineral prospecting; and in construction operations. The new drill, available in both skid-mounted and truck-mounted models, can be used to core to depths of 4500 feet, according to the brochure. The new folder fully describes the rigs many special features; the hydraulic drill head, octagonal spindle, heavy duty transmission and power train, automatic chuck, air brake and clutch, convenient control placement, hoists and sealed hydraulic circuit. Also described are some related accessories: a line of masts for the drill rig, water pumps, diamond bits and core barrels.

(Circle 15 in Readers' Service Dept.)

VIBRATION—A 16-page brochure describing the complete line of products manufactured by MB Electronics to excite, measure and control vibration is now available. The booklet describes the principles of vibration testing and gives a description and specifications for the complete line of MB electrodynamic vibration exciters, electrohydraulic shaker systems, electronic power supplies and sine and random motion electronic control consoles. Electrodynamic exciters offer maximum force outputs from 1.2 to 100,000 lbs. Electronic power supplies have output tube plate dissipation maximums of from 2KW to 240KW. The booklet also includes sections on vibration pickups and vibration meters used in testing engines, missiles, rockets and equipment of any type subject to vibration. A final section covers MB's vibration isolating Isomode pad and engine, machinery and shipping container mounts.

(Circle 16 in Readers' Service Dept.)

CASTERS—A 75-page educational buying aid for all personnel involved in purchasing wheels and casters has been published by The Colson Corpo-



ration. According to D. F. Adams, Colson's vice president in charge of sales, "The information contained in the booklet, 'Colson's Comparative Model Number and Dimensional Chart' provides our buying public with a greater means of accurate comparison." The Colson brochure compares its casters to that of five other manufacturers. As much as possible, the booklet is a self-indexing comparison. Each comparison section is divided into two parts—the caster section and immediately following this is the wheel section. In all cases the Colson model caster is listed first. The competitive model is indented and is directly beneath. The booklet, developed to aid purchasing agents in obtaining the most quality for a reasonable price, lists virtually every caster model and its physical characteristics.

(Circle 17 in Readers' Service Dept.)

WATER—The story of water and the huge money outlay necessary to pay our annual water bill each year is told in a new 16-page booklet just released by Caterpillar Tractor Company. It is entitled, "Water Bill U.S.A." Day by day our national water problem becomes more acute—more costly, but, for the most part, we do not realize what is happening and the terrible threat it poses to our future, the publication states. The booklet discusses this problem and tells of ways in which Americans are working to solve it with better farming practices and watershed control programs.

(Circle 18 in Readers' Service Dept.)

PHOTOCOPYING—Bulletin 100, a 4-page combination brochure and swatch book, has been prepared by Transcopy, Inc. to described its line of diffusion transfer photocopying materials. Product descriptions and uses for over 25 different weights and types of negative and positive papers and films are outlined in the booklet. These papers and films include Transcopy's new Super-30 Positive—a positive paper designed to lengthen solution life—six different colored positives, card stock, transparent films, and others. Also included are brief descriptions of Transcopy's Star and Mercury photocopiers.

(Circle 19 in Readers' Service Dept.)

EQUIPMENT—Hydreco gear pumps, control valves, and motors, and their application on mobile equipment and production machinery, are the subjects of a new general bulletin just released by the Hydreco Division of the New York Air Brake Company. In addition to providing comprehensive performance data on the complete line of Hydreco products, the 8-page bulletin contains photographs and cutaway drawings illustrating the construction and design features of each of the various components. Also described in detail are the constructions features incorporated in Hydreco pumps and motors, and the firm's Hollow-Plunger control valve.

(Circle 20 in Readers' Service Dept.)

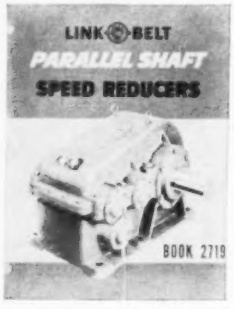
ATOMIZER—Bulletin 51, a 4-page brochure entitled: "The Bowen Spray Machine and Centrifugal Atomizer Wheels . . . Engineered for Controlled Atomization," is available from Bowen Engineering Inc. The bulletin discusses atomization techniques, Bowen Spray Dryer designs, and the flexibility of centrifugal atomization. It gives information on the Bowen Spray Machine and the different Bowen Atomizer Wheels used in conjunction with it for various spray drying applications.

(Circle 21 in Readers' Service Dept.)

REFERENCE—A 64-page Groban Supply Company "Equipment Catlog and Hydraulic Reference Manual" is now available. Groban manufactured and government and industrial surplus products are illustrated and described with engineering specifications, technical drawings, suggested usages, etc. The catalog covers electrical, hydraulic and mechanical items used for original manufacture or maintenance in every industry. Included are air compressors; diesel parts; fluid and gas pressure tanks; generating plants AC-DC; hoists; hydraulic control valves, cylinders, gauges, motors and pumps; superchargers; ventilating blowers; water pumps and many, many more.

(Circle 22 in Readers' Service Dept.)

SHAFT REDUCERS—"Parallel Shaft Speed Reducers" is a new 36-page book (2719) that describes Link-Belt's completely redesigned and expanded



line of "balanced design" parallel shaft reducers in fifty-seven sizes, including twenty-three new sizes. Single, double and triple reduction units are available in capacities up to 2,800 h.p. at high or low output speeds, and ratios up to 292:1. Book 2719 describes the complete line and includes full information for selecting the correct drive for every application. Sixteen pages of rating tables contain thermal and mechanical horsepower ratings for each input and output speed. Load classes are shown for almost 250 driven machines. Overhung loads, extended shafts and outboard bearings, dimensions and actual ratios are included in additional tables.

(Circle 23 in Readers' Service Dept.)

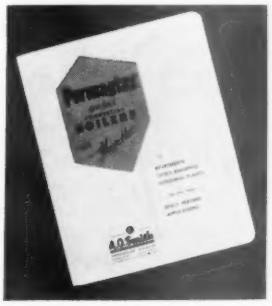
HANDLING—"Move Up to Bulk Handling," a 6-page bulletin published by Dracco Division of Fuller Company, describes ways in which it is claimed plastics users save costs and get better productivity by modernizing their methods for handling pelletized plastics. Bulletin #532 points out that "buying by the bag and then handling by hand adds to the cost, but not to the value of incoming materials." By switching from bag to bulk handling with pneumatic conveying, firms using a million pounds of polyethylene a month can save up to $13,000 a month, the bulletin says. Shown are examples of combination and suction-type Airstream Conveyor Systems and how they are used in plastic processing plants. Also described are actual installations ranging from a comprehensive, automatically controlled, 11-system installation to a smaller, yet highly versatile system used by a medium sized producer of plastic film. In each case, conveyor installations had to be engineered around manufacturing procedures and plant structure peculiar to each user, it is revealed.

(Circle 24 in Readers' Service Dept.)

FLUORESCENT—A handy 19-page publication listing several hundred compounds exhibiting fluorescent characteristics is now available as a guide to identifying solutions through their fluorescent properties. Compiled as a result of years of research with the Aminco-Bowman Spectrophotofluorometer, the publication lists not only compounds, but activation and fluorescing wavelengths, pH values, and ultimate sensitivities (concentration in micrograms-permilliliter producing a useful ten per cent full-scale meter deflection at maximum sensitivity). The publication also contains a bibliography of approximately forty fluorometry papers describing a wide range of research projects; many are available without charge as reprints from Aminco. The compounds list and Bulletin 2336, describing the Aminco-Bowman Spectrophotofluorometer in detail, are available from the American Instrument Company, Inc.

(Circle 25 in Readers' Service Dept.)

HEATING—A 100-page Permaglas hydronic heating manual for commercial application, number PB-125, is now available to heating contractors,



architects and designers of modern hydronic heating systems, according to an announcement by the Permaglas Division, A. O. Smith Corporation. The Permaglas manual for commercial installations is divided into five sections and provides various application details and new systems features resulting from changing installation trends. One section of the new manual is devoted to "Basic Principles" with details on: heat emission rate; selection of temperature drop; flow rate of water through a system; measurement of system pressure drop; the Milinch, head pressure; selection of a pump; and air separation and pressure purging. Other sections are devoted to "Boiler Sizing," "Modern System Design," and "Boiler Replacement Piping." The manual, complete with sizing charts, specifications and diagrams, wraps up into one cover all basic details for the installation and selection of equipment for a modern "hydronic" heating system.

(Circle 26 in Readers' Service Dept.)

LOAD-SPAN TABLES—A 4-page load-span catalog section covering precast concrete roof and floor channels has been prepared by the George Rackle & Sons Company. The section covers standard 24-in. wide channel with nominal 4-in., 6-in., 8-in., and 12-in. depth. Charts for each size show allowable superimposed loads in pounds/sq. ft. Each page is illustrated with a dimensional drawing of the channel cross-section. The formula used in figuring loadings is also included.

(Circle 27 in Readers' Service Dept.)

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in these columns, merely circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

Board Adopts Model Law for Engineers at Fall Meeting

The National Directors of NSPE met in Denver, Colorado, October 19-21, for their annual fall meeting. Among the programs which met action after long pending was the model law for engineering registration as recently approved by the National Council of State Boards of Engineering Examiners (NCSBEE).

Other highlights of the meeting included:

- Approval of action for the certification of technicians recommended by the Engineering Technicians Committee.
- Announcement of a new newsletter for engineers in government practice.
- Approval of a uniform student rate for subscriptions to the AMERICAN ENGINEER.
- Presentation of a new and more thorough membership program.
- Authorization of the publication of a legislative handbook with a target date of January, 1961.

Engineers' Week

Engineers' Week Committee Chairman Warren G. Stadden shows promotional kits to members of the Board.

Although the Board adopted the model law suggested by NCSBEE, they rejected for further study the suggested model law for land surveyors. Adoption of the model law for engineering registration climaxes several years of study and work by the Board in this area. Before this law would be applied in any state it is expected that the wording would be changed to suit local conditions, but the major phases of the law make it a fairly universal one. The various sections set forth definitions of terms, qualifications, terms and conditions for the board of examiners, powers of the board, general requirements for registration, and the regulation, of applying or receiving the appropriate certificate.

In connection with the controversial section of the model law on corporate practice, Robert Williamson, chairman of the Registration Committee, told the Board, "The intent of Section 22 is simply to permit individual registered professional engineers to practice or offer to practice engineering through a partnership, joint stock company or corporation and to permit the partnership, joint stock company or corporation to make charges for these services and have a legal right to collect for them."

The provision of corporate and partnership obligations would allow individual registered engineers to practice through such forms of organization, provided the individuals shall be liable for their professional acts and provided that the personnel of the corporation or partnership who perform engineering services are registered. In addition, it would be required that all final plans, designs, drawings, etc. involving engineering judgment and discretion shall be signed and sealed by the registered engineers who prepared them.

Objections were also raised by some delegates to the clause exempting Federal employees from registration requirements. Williamson reminded the Board that deleting the clause would lessen the chances of having the law passed in many states. It was decided that the law might be more generally acceptable if the clause remained.

An interesting discussion evolved over the report of the Engineering Technicians Committee, which resulted in the adoption by the Board of the nine committee recommendations set forth in the article entitled "Institute Recommended to Certify Technicians" in the October issue of the AMERICAN ENGINEER. The article also set forth conditions under which the institute would be established and operated.

The Functional Section for Engineers in Government announced the beginning of a newsletter which can be ordered by using the order blank on page 15 of this issue. The newsletter will be similar in character to the other three newsletters now being published by the Society.

The Policy Review Committee recommended eight changes or studies to be made in the by-laws. Also under their suggestion the Board voted to establish a standard rate of $1.50 for all student

subscriptions to the AMERICAN ENGINEER. Previously some student groups had been paying only $1.00.

Other changes of the Policy Review Committee included word changes or recommendations for study of NSPE's policies toward national defense, natural resources, public works, registration of PE's in industry, reciprocity of registration, Federal Government research, and the relationship of surveyors to professional engineers.

The new membership policy suggested by the Committee involves the personal sponsorship of new members by older members. This plan, a version of the ones used most commonly by civic groups, is planned to give registered engineers more incentive to join, and to keep the interest and enthusiasm of new members at a high ebb.

It is hoped that having one person introduce each new member to the Society and its programs and policies, will eliminate the large number of introductory members who do not affiliate at the termination of their introductory period.

The Legislative Committee hopes to have distributed by January, 1961, a legislative handbook which will assist the state societies in their legislative activities. One source of information for the book is a questionnaire which is being mailed to the state societies for descriptions of their past experience with legislation. The January deadline is set up in hopes that the book will be available to the various societies when state legislatures convene in the early part of the year.

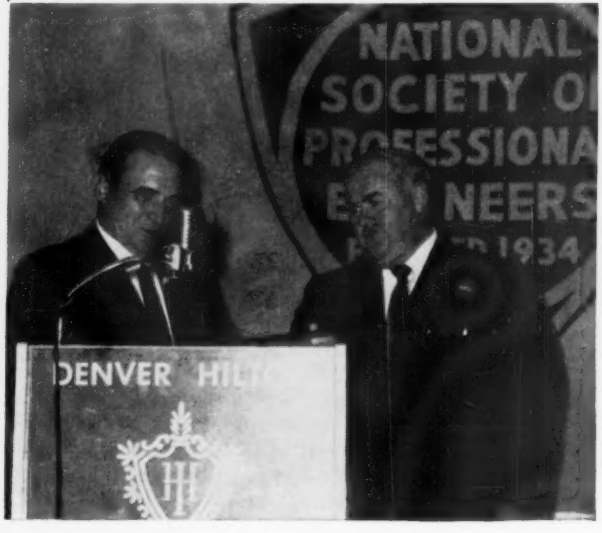
A recommendation made by the State Society and Chapter Activities Committee to investigate the possibility of developing and maintaining special bibliographies on engineering suitable for extracurricular reading for students at all levels of schooling. It was suggested that this could be done in cooperation with other interested engineering organizations and through the Library of Congress, but the matter was referred to the Engineering Preparation Committee for further study.

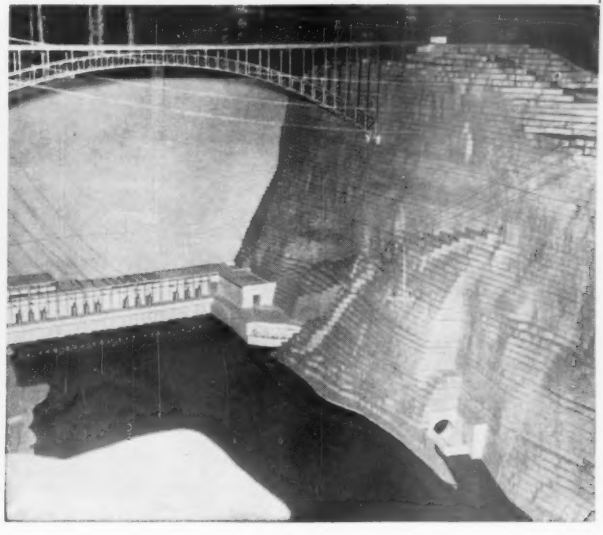
Other recommendations accepted by the Board from the Chapter Activities Committee included a better filing system for material sent to local chapters, the instituting of a uniform July 1 date as the commencement date for administrative years within state and local groups, and a request that state societies endorse officially the NSPE publication, "Ethics for Engineers."

The Ethical Practices Committee brought to the attention of the Board a suggestion that more aggressive action be taken to determine whether or not to start a move to have registered professional engineers listed as a group in the telephone directory. A meeting in July with officials of AT&T indicated that consideration might be given to such a listing provided that there were sufficient interest and a sizable number of listings. Since the Consulting Engineers Council is also working on a similar move, the Committee will attempt to determine

Speaker Receives Award

Hon. Floyd E. Dominy, Commissioner, United States Bureau of Reclamation (left in left photo) accepts for the Bureau an award from J. Phillip Murphy representing the American Institute of Steel Construction. The award is made for work done on the Glen Canyon Bridge. The bridge won the first award in the class A division for bridges with spans of 400 feet or more, and is shown in the model at the right which was on display among other engineering exhibits at the NSPE Fall Meeting. Dominy addressed the Board of Directors at a general luncheon on the subject, "The Professional Engineer in the Bureau of Reclamation." The text of Dominy's speech will be run in the December AMERICAN ENGINEER.





Thoughts on Professionalism...

By PAUL H. ROBBINS, P.E.
NSPE Executive Director

Young Engineers' Month

WHAT defines a "young engineer" has never been precisely set forth. There are those of mature years and graying hair who would be recognized by all as "young" in approach to many engineering problems. There are those young in years with a maturity far beyond their years.

BUT without precise definition, all in the profession recognize a responsibility to give every assistance possible to those whose years of experience have not met some of the problems older engineers have faced.

THIS is a particular responsibility of a professional society. Any profession must be ever conscious that it inculcates in future generations the best of the philosophies and experiences of the previous years. But at the same time the more experienced engineers must realize that the experience of the past does not necessarily determine the paths of the future. Wise heads are needed to weld the wisdom of past experience with the unfettered thinking of the less experienced.

AT least once each year chapters should give particular attention to this opportunity to profit from the new ideas of its younger members. This is why NSPE has designated the month of November for its chapters and state societies to encourage young engineers to take over the programs of the month. Reports of these meetings have shown repeated stimulation to young and older members.

SOME chapters turn over their meetings to the young engineers. Others honor the younger engineers at this time. Still others concentrate on the special problems of young engineers calling on both the experienced older members and the wisdom of youth to suggest solutions. Whatever the program, it is in the best traditions of professional concern that a helping hand be extended to those who can profit by such discussions.

BUT although November is suggested as the month for such discussions, chapters should not be content that their responsibility for young engineers has been met. Young engineers give real strength to all state society and chapter activities. Their thoughts and energies are needed in all professional activities. Every committee can well afford a liberal ratio of young engineers, and young engineers should be willing to devote a portion of their energies to the advancement of their profession. For only as the entire profession advances in stature, service and recognition, can their own futures be secure and rewarding.

whether one listing could be settled upon to satisfy both groups. Questionnaires will be mailed to a random group of both consultants and NSPE members to discover the general feelings of engineers on the matter, following which a meeting of both groups will be held to consider the results.

A resolution presented by the Ohio delegation requested NSPE to adopt the position that field party personnel do not fall within the province of the Davis-Bacon Act requirements. Soliciting the support of NSPE with this view against the Department of Labor, the delegation presented examples of struggles over this job classification in two different states, and urged rapid action on the policy.

The New York State Society of Professional Engineers presented a memo recommending certain types of programs which offer technological aid in the under-developed countries. It was presented to the Board with the recommendation that it be referred to an appropriate committee for consideration and action.

The Professional Engineers of Colorado also sponsored two panel discussions on Friday morning—one on the problems of education and professional development of engineers in industry, and the other concerning the current status of the professional engineer in government.

The industry panel was moderated by Carl E. Dahlquist of Stearns Roger Manufacturing Co., while Wesley E. Gilbertson of the U.S. Public Health Service conducted the government discussion.

A full schedule of activities for the ladies planned by Mrs. E. W. F. Peterson included a luncheon at the Denver Athletic Club where Editor Jack Foster of the Rocky Mountain News spoke.

Members of the Colorado Society responsible for the successfully run meeting were E. V. Konkel, CSPE president; Sam Hawkins, general chairman; Hugh Hempel, national directors' program chairman; E. W. F. Peterson, state society program chairman; E. W. Thorson, promotion and public relations; G. C. Hahn, exhibits, and C. K. Kolstad, Colorado Springs Activities.—**End.**

Functional Section Meets, Makes Plans

The Executive Committee of the Functional Section for Engineers in Government Practice met Wednesday, October 19, to discuss the status of current projects and to plan for the coming year's activities.

Considering current problems reported by the Subcommittee on Engineers in the Uniformed Services, the Committee endorsed for later recommendation to the board several measures that would enable engineers in the services to receive better pay and improved benefits as a means of improving the retention rate. The Subcommittee also recommended that action be taken to arrange for engineering ROTC students to receive more credits for advanced ROTC courses, encouraging them to continue through the four-year plan.

The Committee approved the draft of a proposed pamphlet entitled "Action Programs for the State Society and Chapter Government Functional Section," which will discuss successful activities by local functional sections. The pamphlet will be distributed among state societies and local chapters in order to provide guidance for expanded functional section programs.

In order to improve communications between the national and local sections, it was decided that copies of the meeting's minutes should be circulated to local groups.

Regional Meetings Considered for Spring

Meeting Wednesday, October 19, before the Board of Directors convened, the executive committee of the Functional Section for Consulting Engineers in Private Practice discussed progress reports and future activities.

The success of the recent regional meetings as a forum for an exchange of ideas was discussed, and it was decided to plan another series of meetings, possibly in the spring of 1961.

State-level solicitation was suggested as a means of raising additional funds to carry out the Sections programs. Following the same process as in 1960, contact will be made with firms in the separate states for contributions.

A reply was drafted to be sent to Representative Harry R. Sheppard (Calif.) who requested comment from the Functional Section on excessive costs to the Government due to architect-engineer costs resulting from change orders. The reply included an offer to meet with Sheppard on the matter.

Attention was given to ways and means to establish cooperative relations between the Functional Section and Consulting Engineers Council and avoid duplication of effort. The Chairman will contact the President of CEC in an effort to promote a joint meeting of the two groups discussing the problem.

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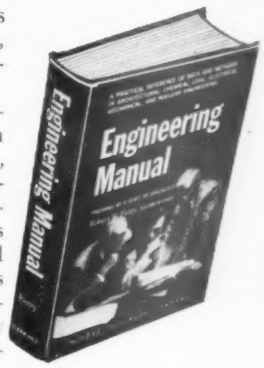

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III. PHYSICAL AND CHEMICAL DATA

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- Structural
- Mechanical
- Electrical

V. CHEMICAL ENGINEERING
- Heat Transfer
- Evaporation
- Drying
- Screening
- Filtration
- Centrifuges
- Mists and Dusts
- Distillation
- Absorption
- Solvent Extraction
- Crystallization

VI. CIVIL ENGINEERING
- Surveying
- Soil Mechanics and Foundations
- Highway and Traffic Engineering
- Hydraulics: Water Supply, Sewerage, and Drainage
- Structural Analysis and Design

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- Units
- Electric-circuit Theory
- Electrical Machinery

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- Mechanics
- Machine Design Data
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Panel Discusses Status of Engineers in Government

A Friday morning panel session on "The Current Status of the Professional Engineer in Government," proved to be one of the feature attractions of the Denver Meeting.

Moderated by Wesley E. Gilbertson, chairman of the NSPE Functional Section for Engineers in Government Practice, the panel included: Floyd E. Dominy, commissioner, U.S. Bureau of Reclamation; Grant Bloodgood, assistant commissioner and chief engineer, U.S. Bureau of Reclamation; Walter E. Elder, director Region 10, U.S. Civil Service Commission; William J. Hilty, supervisor of classification, State of Colorado; and F. Arnold McDermott, director of Career Service Authority, City and County of Denver.

Discussing engineers in the Federal Government, several interesting items were brought out. The Government's salary ranges for the lower and middle grades are approaching salaries offered for comparable positions in non-Government employment, but the Government's most serious recruitment problems are still concerned with engineers and scientists in the middle and upper grades. It was mentioned that employment of more qualified engineering technicians would result in better utilization of professional engineers. One suggestion for improving the recruitment problem for the Federal Government was closer contact with colleges and universities.

Mentioning problems with city engineers, the elaborate salary survey system established by the City of Denver which assures that prevailing salaries are paid to city engineers was discussed. As a result of this system the salaries of Denver's city engineers have risen 35 per cent in the last five years. Denver requires registration for all engineers above the grade of Civil Engineer I, but written examinations are de-emphasized for appointment to most engineering positions as registration is considered an assurance of an individual's qualifications.

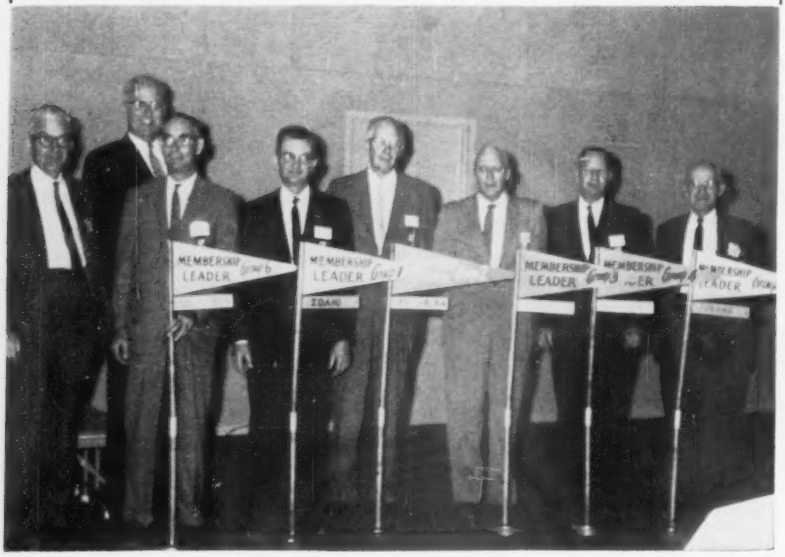
Following the panel the Professional Engineers of Colorado officially established a Government Functional Section with William N. Gahr, chief engineer, Colorado State Department of Public Health, as chairman.

AIEE Visitor

Max Knight, official observer at the NSPE Fall Meeting for the American Institute of Electrical Engineers, is shown here as he expressed greetings from his organization to the Board of Directors.

The panel on Government engineers was one of two sponsored by the Colorado Society which were held concurrently with the final session of the Board of Directors. The second session discussed matters concerning the problems of education and the professional development of the engineer in industry.

Membership Contest Leaders



State societies leading their respective groups in the membership contest when the Fall Meeting convened October 19 in Denver, Colorado, were awarded banners for their accomplishments. Shown here receiving banners for each of the groups are (l. to r.) Noah E. Hull, president, who congratulated winners; Harvey Pierce, chairman of the Membership Committee; Roberts Bouson, director from Pennsylvania; Earl Reynolds, Idaho; George Rawlins, North Carolina; Edward Van Wagenen, Florida; James Evans, Alabama; and Robert Loveland, Indiana. Final awards are made at the annual meeting.

Strictly Business

Personalities . . . **President Jacob O. Whitlock** of **Midwest Prestressed Concrete Co.** has been elected president of the Prestressed Concrete Institute for 1960-61 . . . **Lester W. Penn Sr.** has been appointed construction engineer for the campus development program at **St. Louis University** . . . **Melpar's** Applied Science Division announces the appointment of **James M. Cryer Jr.** as manager of the division and **Arthur Kohlenberg** as technical director of the division . . . **A. W. Piggot** has been appointed assistant manager of the new product research and contract sales department at **Lyon Metal Products, Inc.** . . . Appointments have been announced by **Cornell-Dubilier Electronics Division** of the **Federal Pacific Electric Co.** of **Glenn E. Ronk** to the position of general sales director, and **Carl F. Stillman** as an administrative assistant . . . **James A. Ross** has been appointed to the position of manager, equipment division of **Computer Engineering Associated, Inc.** . . . **Kollsman Instrument Corporation** has announced the formation of a research division to be headed by **Arthur S. Robinson** as director . . . **PRD Electronics, Inc.** has announced the appointment of **Thomas H. O'Brien** as director of operations and **Harry C. Nelson** as director of marketing.

Mr. Whitlock

Alfred Strogoff has been appointed vice president and general manager of **Adler Electronics, Inc.** . . . The **J. N. Fauver Co.**, announces the appointment of **Reginald W. MacDonald** to their Detroit area sales engineering staff . . . Appointment of **John P. Pittman** to the position of regional sales manager for **Burroughs' Electronic Tube Division** has been announced . . . **Joseph P. Foley** has been named marketing manager of **Van Norman Industries, Inc.** electronics division . . . **Lindley K. Nichols** has joined the management consulting division of **Ebasco Services, Inc.**, as chief consultant . . . **Sid. W. Jagger** has been named a vice president of **Reynolds Aluminum Service Corporation** . . . **Morris Spector** has been named electronics staff manager of **Thompson Ramo Wooldridge International** . . . **Recold Corporation** has appointed three new vice presidents —**E. V. Jarvis** for finance, **C. M. Wilson** for sales, and **C. R. Baumhofer** for manufacturing . . . **William T. Brazelton,** associate professor of chemical engineering has been named assistant dean for undergraduate administration at the Technological Institute of **Northwestern University.**

Mr. Foley

Dr. Remo Pellin has joined **Motorola's** semiconductor products division as product manager . . . **Gerard A. Forlenza** has been appointed assistant general manager of **American Cyanamid Co.'s** engineering & construction division . . . **Telecomputing Corporation** has appointed **Frank Kress** to the new position of eastern regional sales manager for its date instruments division . . . **R. E. Woodcock** has been named manager of **Dana Corporation's Fort Wayne Division . . . Irving Zweifler** has joined **General Microwave Corporation** as vice president and manager of manufacturing . . . **Eanco Inc.**, has named **Arthur W. Rau** as sales manager . . . The appointment of **A. C. Hawthorne Jr.** as a field service engineer for **A. M. Byer's Co.'s** Philadelphia Division has been announced . . . **F. W. Bloecher Jr.** has been made assistant manager of the mining chemicals department of **Cyanamid International** . . . **Jules C. Laegeler** has been appointed vice president in charge of engineering for the **Frank G. Hough Co.**

Mr. Woodcock

Federal Pacific Electric Co. has appointed **J. N. Hutson** as their North Central regional manager . . . The appointment of **Lloyd A. Rager** as manager of the new Products Marketing Department for **LeTourneau-Westinghouse Company . . . Stanley T. Olafson** has been named foreign trade advisor for **Hoffman Electronics Corporation . . . Lawrence W. Wightman** has been appointed assistant to the vice president in charge of operations of **Emerson Electric Manufacturing Company . . . P. T. Bloodsworth** has been appointed eastern sales manager for **Kaiser Steel Corporation** . . . Appointment of **Clinton J. Starke** as plastics engineer in the decorative laminate group of **Food Machinery and Chemical Corporation's** Applications Technical Service Laboratory at Baltimore has been announced . . . **Sperry Products Co.** has appointed **Robert C. Main** as manager of engineering . . . **George R. Vila** has been elected president and chief operating officer of **United States Rubber Co. . . . Sheldon Newberger** has been named director of operations division at **Adler Electronics, Inc. . . . Grant Pulley and Hardware Corporation** has appointed **Ernest J. Rhoads** as industrial sales liaison man for the West Coast.

Mr. Olafson

Nassau Chapter Education Committee

Prominent educators and engineers act as judges for scholarship contest sponsored by the Nassau County Chapter of the New York State Society of Professional Engineers. Left to right—John J. Theobald, superintendent of schools of the City of New York, and Dr. Ernst Weber, president of Polytechnical Institute of Brooklyn, look on as fellow judge, the Hon. Lee Dennison, county executive of Suffolk County, hands the winning paper to Chapter Education Committee Chairman Milton Alpern of North View Ave., Wantagh, N. Y.

Nassau Chapter Holds Contest

The judging for the scholarship contest of the Nassau County Chapter, New York State Society of Professional Engineers was held on Tuesday evening, Sept. 27th at the Sky Club Restaurant at Roosevelt Field, Garden City, N.Y.

The Education Committee of the Nassau Chapter was the host at a dinner which preceded the judging ceremonies.

Acting as judges for the contest were John J. Theobald, superintendent of schools for the City of New York, Dr. Ernst Weber, president of Polytechnical Institute of Brooklyn, and the Hon. Lee Dennison, county executive of Suffolk County.

Application blanks for entrance to the contest were distributed to all the high schools of Nassau County last spring and dead-line for filing contest entries was April 29th.

The contest was open to all 11th grade students in Nassau County and entries were to be in the form of an engineering report on some form of improvement needed in the community of the applicant.

The winner of the contest will receive a $500 1-year engineering scholarship at the engineering college of his choice. Special awards will also be made to students presenting the best paper from each school. All winners and their parents will be the dinner guests of the Nassau County Chapter at their regular November dinner meeting.

Canal Zone Speaker

On a recent trip to the Canal Zone Dr. James H. Sams, left, receives the "Master Key to the Panama Canal" certificate with the grade of "Honorary Aide to the Governor." Dr. Sams, executive secretary of the National Council of State Boards of Engineering Examiners, also spoke to members of the Canal Zone SPE at their September 26th quarterly meeting.

NSPE President Reviews The Year's Activities

This is a particularly important time in the life of our Society, and I wish to report on some of the principal activities of the committees and officers at the national level.

NSPE stands at the threshold of great opportunities, with a broad field of activities opening before us. At the same time, there are some problems facing the Society that need to be solved before we can fully realize our potential.

Today, we are one of the largest engineering societies in the country. Indeed in number of qualified engineer members, we outstrip any other. We have about 47,000 professional engineer members, and 7,000 engineer in training members. But our membership gain in 1960 over 1959 is the smallest in number and percentage, that we have had in the last seven years.

This membership represents less than 25% of the registered engineers in the United States. In addition there are a couple hundred thousand more engineers, who are qualified for registration, but who have not yet realized the advantages of becoming registered engineers.

NSPE must have life—dynamic programs to attract these two groups: the registered to join, and the nonregistered to become registered and then join. To accomplish this purpose requires the combined action of our 54,000 members working at the local, state and national levels.

In many respects, the local chapter is the most important in many of these activities. As Paul Robbins put it, the local chapter is the picture window of our Society. These nonmembers are standing outside, looking in through that window. We must make the picture they see so attractive that they will like what they see, and come knocking at our door to enter and join in the work of the Society.

Each one of us is an NSPE public relations representative in his own community. The public at large, and these other engineers in particular, form their picture of our society and our profession from our members and chapter activities. When we, as individual engineers so conduct ourselves, that we are recognized as true professionals, we bring credit to our profession and our Society. This means that each of us must be always conscious that the true professional is one who serves his community, his state and his profession. In doing this we increase the stature and the standing of our profession. This will build up pride in the profession, stir the individual engineer to have this pride, and make it important for him to identify himself with us in this work.

We, at the national level, cannot reach these individuals directly. Through the activities of the national officers and committees, we can only give counsel and advice. By collecting ideas from all of the states and chapters, studying the various programs, and bringing the best together for passing along to the other states and chapters, the NSPE Membership Committee, and the State Society and Chapter Activities Committee, are constantly developing ideas and suggestions for chapter and state programs that will enable the grass roots members on the firing line to do a more effective job. There are many excellent ideas in the suggestions from these committees. Not all of them will work in all cases, but there are many that will fit into every chapter's programs. We must remember that the best plans are of no avail, if they are not used.

Membership in NSPE must be made to mean something to the nonengineers. The nonregistered engineer must be shown where he can improve his professional standing by becoming registered and joining NSPE. We have plenty of ammunition, if we only use it; for the nonregistered engineer, an educational campaign on the advantages of registration; the sponsoring of courses or seminars on professionalism, as was done in Baltimore; refresher courses to prepare for examinations; such as have been conducted for corps of engineer officers at Ft. Belvoir; instructions on how to apply for registration. Above all, in these activities, each individual engineer, by his personal contact, can do the most effective work. The Texas Society has increased its membership greatly by campaigns of personal contact and is now the largest state society in total membership. A new campaign is underway there now, based on this personal contact.

Noah E. Hull, NSPE president, addresses Denver meeting.

Developments in inter-society relations are coming rapidly. The organization of the engineering profession for more effective action is gaining ground daily. One of the recent developments, and a brand new one, came from the Founder Societies' Past Presidents Task Force on Unity. At their last meeting, in September, this group made a recommendation to their society presidents, that the president and vice presidents of the National Society of Professional Engineers, the Engineers Joint Council,

and the Engineers Council for Professional Development, meet regularly four times a year, to better coordinate the over-all work of the three organizations. As your president, and in accordance with the NSPE policy, of always working with other engineering societies for the advancement of the profession, I have notified the Task Force and the presidents of EJC and ECPD of our willingness to meet with them, at mutually agreeable times.

In another phase of our activities, the Committee on Engineering Technicians is busy developing rules and regulations for the implementation of the Institute for Engineering Technicians. Actual implementation of this important phase of our activities will come during the coming year.

In this day of rapidly changing and expanding technical and scientific development, new problems arise which affect our profession. Recognizing this, two new committees have been appointed.

The first, with Past President Dr. Clark Dunn as chairman, is the Committee on the Merging Role of the Engineer and Scientist.

The second committee is charged with other important studies involving the proposals made for action by the Federal Government which concern the engineering profession, such as the one for a Department of Engineering and Science, or the one for a Department of Urbiculture.

In this campaign year, the National Society of Professional Engineers presented to the platform committees of both the Republican and Democratic Parties a suggested platform plank calling attention to the importance of engineering and scientific activities, and suggested ways that these important men could more effectively be utilized.

Neither of the two presidential candidates has indicated in the campaign that he has a real grasp of the enormity of the role to be played by engineering and science in the coming decade of the 1960's.

Both Vice President Nixon and Senator Kennedy appear to give too little recognition of the existence of such problems as the proper utilization of scientific and engineering manpower, the development of professional career programs which will permit the Federal Government to attract and retain the necessary level of qualified manpower, and the strengthening of our educational preparation for careers in engineering and science.

The next President of the United States must reflect a spirit of total determination to come to grips with the reality of a situation which includes an intense competition for technological supremacy.

Not only the Federal Government but private industry, and business and industrial leaders must focus greatly increased attention on basic science and engineering if we are to continue economic expansion of the United States.

In the field of employment practices, particularly in industry, affairs have been really moving, as you will learn from the Engineer in Industry Committee.

Events in connection with union activities have been particularly heavy. One of the latest: In an NLRB election held at the Sperry Plant on Long Island, in September, the unit of professional employees and technicians voted for no union, in spite of strenuous efforts of the International Union of Electrical Workers and ESA to keep them in the union. NSPE, at the request of the professional engineer employees at Sperry gave counsel to those desiring decertification. Requests for such information and counsel are increasing in frequency, coming both from employees and from industrial management.

Increased activity is occurring in all phases of NSPE.

More student chapters are being formed, the new scholarship foundation has been incorporated, a new model law has been adopted by NCSBEE; the Legislative Committee is working on a guide book for legislative action at state and local levels; the Public Relations Committee is developing the film on professionalism, primarily for use in the engineering schools.

The Functional Sections for Engineers in Government and for Engineers in Private Practice are working to solve questions peculiar to each of their groups.

We are on the march. NSPE is recognized in Washington, as the voice of the engineering profession. The executive and legislative branches of the Government are constantly calling for information and suggestions from our Washington office.

A further addition to the staff, is the first of the field men, whose duty it will be to go around to the chapters and state societies to help them in their problems and promote membership and local activities.

We are growing in size, prestige, and we dare not stop. But we face some problems and one of the most important is just plain money. That stuff is always so hard to come by. We are proud of our society and the work it is doing. Thousands of volunteers are giving freely of their time and energy at the chapter, state, and national levels as committee members and officers. I have always maintained that this was the hardest working outfit that I have ever been connected with, and it is true. This dedication to profession and society is what makes NSPE the power that it is today.

There are limits to what can be done with volunteers' efforts, and all of these fine programs that we are carrying cost money.

You must have a professional staff to do the work required in our national headquarters. We have the smallest staff, by far, of any society anywhere nearly as large as ours.

Our various programs are good and have been developed at the request of our members. You members of the Board have authorized everyone of them. At this Board meeting, you will be presented a revised budget for 1960, and a proposed budget for 1961. Your Budget Committee and your officers have spent many hours working on this budget. The results are what they think will be best for the Society. Some of the projects you favor may not be as well financed as you might wish, but there is not enough money available to do everything that you want. Some things had to be curtailed.

Although the Budget Committee could not allocate as much money

for all the activities as was requested, which by the way is an annual problem, we are still making excellent progress.

This is the first year that NSPE has had the advantage of the increase in national dues, which was voted in 1959. Based on the percentage increase in membership of the past several years, the 1960 income was estimated at $665,000. Due to a somewhat smaller increase in membership than was expected, it has been found necessary to reduce this budget to $650,000. No vital programs have been sacrificed in doing this. This reduction was made possible by economies in operations. This budget compares to a budget of $554,800 in 1959.

The additional funds in the 1960 budget have provided for these increased activities, among others.

Funds were allotted to the Professional Engineers Conference Board for Industry for another in the series of statistical research studies of the professional engineer in industry. This study was previewed at the annual meeting in Boston and is now ready for printing. It promises to be of even more importance than the previous study "Career Satisfactions of Professional Engineers in Industry." Present plans call for a new study every other year, alternating with the NSPE salary survey.

More funds have been provided for meetings of the Board of Ethical Review; larger allotments to the Functional Sections for Engineers in Government and in Private Practice; the Inter-Society Relations Committee conducted its survey of our members on organization of the engineering profession; the results of this survey have had great influence on the profession and have done much to influence closer cooperation among the engineering societies.

NSPE is facing great opportunities. We have the foundation and the start to lift our Society and our profession to greater and greater heights; to be an instrument that will be of untold value to the public and this nation of ours. We must keep going and we must have the ammunition to carry on the work that you and our members have started.—**End.**

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ENGINEERS WEEK

(Continued from page 21)

cover such things as newspaper publicity, exhibits in store windows and other public places, radio and TV programs, speakers bureaus, and film showings. Sample newspaper sections obtained in connection with the 1960 Week are included in the kits.

Film catalogues from U.S. Steel and Allegheny Ludlum Steel are also included in the kits. The catalogues list a number of films suitable for showing to general audiences during Engineers' Week. Order forms for obtaining the films are attached.

A set of seven 20-second TV spot films is available from the National Society as one of the major promotional items for the 1961 Week. These films were produced for the Engineers' Week Committee for use on public service TV time. The films call attention to the varied opportunity in engineering and emphasize the role of engineering and technology in the years ahead. Voice narration in the films is done by experienced net work announcers.

The films are available in sets of seven 16mm prints from the National Society at a cost of $25 per set. Orders should be placed as soon as possible to allow time for advance screening by local television station program directors.

A set of seven 20-second tape recorded announcements for radio use is again available. These seven separate announcements offer local stations a high-level type of public service message for 20-second station breaks. The spots are recorded on one reel of tape, and may be taken directly to the station program director. A set of seven announcements may be ordered from the National Society for $3.50.
—**End.**

Engineers' Week poster design available on logotypes for insertion in newspapers, magazines, industrial house organs, or engineering publications. Type-high "logos" of the size shown may be ordered from the National Society for $1 each.

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The Professional Engineer emblem is available styled as cuff links. Can also be ordered in large 3" size as a metal automobile emblem.

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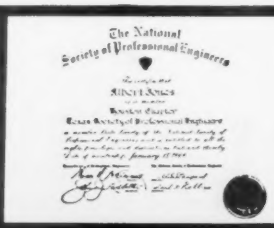

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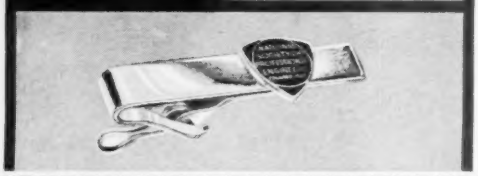

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WITH THE *Auxiliaries*

By Mrs. Clark A. Dunn, Chairman, Ladies Auxiliary Advisory Committee.

By the time this column goes to press, every member of every auxiliary should have her own copy of the 1960 issue of *Engineers Wives*. We hope all of the men and women who read the AMERICAN ENGINEER will have an opportunity to read this latest publication of the Ladies Auxiliary Advisory Committee. We are very proud of this year's edition. It contains reports of all members of the Advisory Committee as well as a wealth of other material which should be valuable to auxiliaries and prospective auxiliaries. Of special importance is a complete roster of all of the 120 auxiliaries in the country. We are deeply indebted to Mrs. Garvin H. Dyer, past president of the Advisory Committee for her tireless work in compiling this booklet and to the staff of NSPE for arranging and printing it in such attractive form.

With the coming of autumn, auxiliaries all over the nation are coming to life. We have reports of many interesting programs which are being started.

The Auxiliary to the Phoenix, Ariz., Chapter reports a successful first meeting. Plans are under way for a membership drive. Their money-making plan is called "Project Five." This means all active members will in some manner raise $5.00 between now and Engineers' Week in February. A part of this will be set aside to present to the Central Chapter to assist them with their scholarship fund.

The Women's Auxiliary of the El Paso Chapter had their first fall meeting in September. The country of Austria provided the theme for

the meeting. The origin of the "Viennese Kaffeeklatsch" was described as members met for a morning coffee. The theme for the October meeting was Spain.

The Auxiliary of the Mercer County, N. J., Chapter will be celebrating its sixth anniversary this November. Their program for the coming year includes a poster contest, a promotion of Engineers' Week and a scholarship award.

The Gloucester-Salem Auxiliary of New Jersey has purchased books on the engineering profession to be placed in high schools of the county. They are also making plans to show films in public schools during Engineers' Week.

The Harrisburg, Pa., Auxiliary has granted $100.00 in donations to the Harrisburg and Camp Hill Public Libraries and $50.00 to the Harrisburg Area Center for Higher Education.

In the State of Washington, the ladies are interested in forming a State auxiliary. They made initial progress toward that goal at the State meeting held in Kennewick in September. A steering committee was selected, made up of a representative from each of the eight chapters. They will study the possibilities of a State organization and are hopeful that by the time of the annual national meeting in Seattle next summer, they will be ready to organize.

PLANNING

(Continued from page 28)

suggest changes in any part of the master plan where he considers the costs of city services to be disproportionate to the value of the plan. In other words, it is the city engineer's duty and responsibility to sit at the right hand of the planner, guiding and directing all aspects of evaluation leading up to the final studies of the plan. The city planner completes the project and shows the way; the city engineer must help implement and carry through the program or else it will become just another book on the shelf.

The engineer by nature is a practical man and is basically concerned with the value of statistics on a mathematical basis. It would be

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well to point out that the engineer who concerns himself with planning broadens his horizon to statistical evaluation.

For example, any engineer readily accepts the formula cost of roads at X width and Y surface; they cost Z dollars per running foot. But has he thought of the running cost of slums? The following statistics compiled by the Federal Works Agency Public Buildings Administration serve to illustrate this point. Slums in the United States account for 33 per cent of the population, 45 per cent of major crime, 55 per cent of juvenile delinquency, 50 per cent of arrests, 60 per cent of tuberculosis, 50 per cent of all disease, 35 per cent of fires, 45 per cent of total city service costs; yet the revenues from slums are only 6 per cent. Think what the lost and wasted tax dollars could provide in terms of either tax-reduction or added civic betterment.

Just as morale is an important item in the efficiency of business, so is the city benefited by a citizenry who can take pride in it. For with community pride comes community interest. Not only will the city be more attractive but a safer place for children to play, a better place to shop, and a happier place for adults to work and enjoy recreation as well as good local and regional transportation.

These are, perhaps, intangible statistics, the type of things not taught in an engineering school, but they are the human statistics that make up every community.

The city engineer should add this new set of values to his practical professional background to give him a sympathetic understanding of what city planning can mean to the community and to the engineer himself, and he will see that he plays a large and vital part in the development of any sane and realistic city planning.—**End.**

LETTERS

(Continued from page 10)

the four scientific societies to which I belong. The National Education Association did more good for science, mathematics, and engineering during the last forty years than all of the founder societies put together.

John L. Everhart, P.E. (AE, Sep-

tember), asks some caustic questions of Dr. Russell: How about remedial courses in English which didn't exist thirty years ago? How about remedial English courses in college English? How about necessity of tutoring for modern colleges? Fair questions, unless J.I.E. has been away so long from colleges that he does not know how much tougher they are now than they were back in 1930. Do you know that college is much tougher now than it was then? Oldsters will cry aloud at such a statement because they can remember how tough it was for them to get through it when they attended. Well, I took a degree in engineering in 1924 and another one in the same field in 1954. Maybe I know how much the curriculum has been beefed up in that time.

Back in 1924 with a degree and 144 semester hours I was a very smart gent—or at least so I thought. Thirty-six years, six degrees, and 450 semester hours later I am not so sure that I am so smart. One thing I do know from 600 semester hours in science, mathematics, and engineering, is that school gets tougher and tougher every year; that high school students come in better and better prepared; that colleges continually raise the sights, this being possible because the secondary schools, and the elementary schools, are doing a better job right along.

If I were to bring to a college my "excellent" preparation of forty years ago it would be necessary for me to go at least a full year more before I could do credible job of being a freshman. This I know because I have worked alongside entering freshmen from 1920 to 1959; I see what they have and I know what I had—yes, and I know what Eisenhower and Herbert Hoover had, or didn't have, when they got to college too. I have been engaged in secondary education work for more than thirty years, and have been working as an engineer (civil and mining) for a like number of years. As a hobby I have taken at least ten semester hours of college work each year, racking up more than 250 semester hours since I got a Ph.D. in a science field. One gets pretty well acquainted with how education is progressing by doing it this way. I think it is lucky that so many people got degrees thirty years ago because many who did so couldn't make the grade now. I suggest that the critics who would attack Dr. Russell, go out and learn what they are talking about before they make the trial. Then they will probably be smart enough to recognize that he spoke the truth.

DR. E. R. HARRINGTON, P.E.
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ETHICS

(Continued from page 33)

Board to recall his license. This course is proper but these steps are not easily taken even when they are taken from a sound, firm footing. (This actual case was sent by PSPE to the NSPE Board of Ethical Review for comment. The BER decision was printed on page 42 in the April, 1960, issue of AMERICAN ENGINEER.

For a second example, consider a group of registered engineers working for the federal government. They have prepared specifications for a multi-million dollar reclamation project for a foreign country. Uncle Sam is donating the money plus the plans and the foreign country will let the contract.

After completing the plans, these registered engineers resigned from their government positions, incorporated themselves and bid in conjunction with an established firm on the construction job when it was offered by officials of the foreign country. They were successful. A competing firm charged they were unethical because they were compensated for making the plans and would profit more from doing the work.

Do any of the words contained in *Ethics for Engineers* make this act unethical? You may find many references which almost fit the bill, but what, specifically, makes this approach unethical? The NSPE Board of Ethical Review, which gives nonenforceable opinions when requested, split on this matter. They recommended that our Rules of Professional Conduct should be changed. Their report, incidentally was published on Page 5 in the September, 1959, issue of AMERICAN ENGINEER.

For our third example, let us consider a borough which has hired a professional engineer, on a small retainer fee because their budget will not permit a full-time engineer. When they hired him, the borough commissioners knew that in order to augment his income, the borough engineer had worked for clients who were land developers. The engineer, changing into his private consultant's hat, prepares plans for the client. The

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client then presents these plans to the borough officials who turn them over, for approval, to their engineer, who has changed back into his borough engineer's hat. If final plans conform with the land development specifications approved and published by the borough commissioners, is there a conflict of interests here? If there is, is the action unethical? Should boroughs be forced to raise taxes to hire a full-time engineer to prevent this type of thing?

As long as the engineer acts with the full knowledge and approval of both clients, after he has made his position clear to each, he is not considered to be unethical under our current rules. Rule of Professional Conduct #17 states, "An engineer in private practice may be employed by more than one party when the interests and time schedules of the several parties do not conflict." Some PSPE members currently maintain that it is the responsibility of the borough to set up their own rules to prohibit this practice. Others believe PSPE is shirking its responsibility if it does not rule against this type of action. Which attitude is an enlightened one for the PSPE to take?

Engineers are professional people in the same degree as doctors and lawyers, but they do not work as personally with individuals. In spite of this difference, the three professions have something in common.

When doctors become more interested in their fees than in healing and when lawyers become more interested in money than in justice, they deserve the scorn and lack of faith which will be surely accorded them by their contemporaries. If the same lack of understanding of the values of life invades engineering, engineers as a group and as individuals will be retarded in personal growth and in public acceptance.—**End.**

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TEACHING

(Continued from page 38)

pleted these minor problems they are ready for a major assignment. These are very comprehensive problems involving many fields of endeavor such as materials handling, hydraulics, air-conditioning, machine design, power applications and others. An attempt is made to achieve current interest. Last year the problem was to design a missile launching station in the South Pacific. This year the problem was to design an exhibit for an industrial fair in Australia to represent the United States. This exhibit even included a solar energy display with actual working devices operating on solar energy. Quite obviously it would be impossible to complete all of such a design in one semester. The portions which interest the students are worked upon and required data from other portions are provided by the liaison engineer. When the semester ends there is a sizable pile of drawings and pages of calculations which are available to the faculty for review.

In the missile station problem there was one group working on a gas turbine power plant, another on a fuel handling and transfer system, another on a nitric acid system, some on unloading and warehousing facilities involving cranes and material handling facilities, and others on air-conditioning of vital areas. Some had to study the constituents of sea water in the Pacific in order to design the water treating process, others had to examine the tide fluctuations to determine how to unload fuel oil from tankers, and others had to study the electrical requirements to determine power plant size. Much of this was not strictly in the mechanical engineering field but it is felt that the cross training was very beneficial.

The grading is difficult in a course of this nature. All work was judged on the basis of non-acceptable (requiring it to be improved and re-submitted), acceptable, and excellent. Group work was judged by groups, but since a man was never in the same group for two projects this did not allow a weak student to coast on the others to any great extent. At the end of the course the grades were assigned from the problem ratings, a compilation of student ratings, and notes made by the professor in the review sessions.

In general it is felt that this type of course provides a good transition to professional life. Most of the students are enthusiastic because it gives them a chance to show what they can do. Several weak students have shown to be excellent leaders and organizers. Some good students have had difficulty because they were too used to book learning and had never been tested in the field of personal judgment and perseverance. Many students were amazed to find that they could study material without direct guidance and could apply new concepts and even new theory. Searching catalogs and handbooks, and reading current industrial magazines almost became a hobby with some of the men. A course of this nature requires a great deal of effort on the part of the students and faculty but the results have been well worth that effort.—**End.**

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Adache Associates, Inc. 56
Edw. J. Adamec 55
Aerial Map Service Co. 59
Aeroglide Corp. 59
Aero Service Corp. 57
Albright & Friel, Inc. 57
Allied Metal Hose Co. 21
American Air Surveys 59
Jack Ammann, Inc 58
Ammann & Whitney 55
Asphalt Institute ..... 8 & 9
Auburn and Associates, Inc. 57
W. L. Badger and Assoc., Inc. 54
Michael Baker Jr., Inc. 57
Harry Balke Engineers 56
Elmer S. Barrett Associates 56
Bedell and Nelson 54
Benham Engineering Co. 59
Black & Veatch 54
Borden Metal Products Co. 22
John Webster Brown 55
Buchart Engineering Corp 58
Burns & McDonnell 54
Burns & Roe, Inc. 55
Capitol Engineering Corporation 57
Conrad M. Carlsrud 53
James H. Carr, Jr. 53
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Dean Products Inc. 15
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John V. Dinan 56
Electrical Contractors Assoc., Inc. 57
Engineers, Inc. 55
Engineers Laboratories 58
Eustis Engineering Company 54
Fay, Spofford & Thorndike 54
Ferguson-Gates Engineering Co. 58
Forrest and Cotton, Inc. 58
Christopher J. Foster 55
Frazier-Simplex, Inc. 59
Freese & Nichols & Endress 58
Galv-Weld 12
Gannett, Fleming, Corddry & Carpenter, Inc. 57
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Kaiser Engineers 53
Robert R. Kerns 53
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Kuljian Corporation 57
D. C. Latella & Associates 57
Lawrie & Green & Associates 57
Walter E. Lobo 55
Lockwood, Andrews & Newnam 58
Madigan-Hyland 55
Marchant Inc. 3-5
Metcalf & Eddy 54
Miner and Miner 53
Modjeski and Masters 57
Momar Industries 16
Moran, Proctor, Muser & Rutledge 55
John J. Mozzochi & Assoc. 53
Niagara Blower Co. 19
The C. W. Nofsinger Co. 55
James P. O'Donnell 56
Palmer & Baker Engineers, Inc. 53
Parsons, Brinckerhoff, Quade & Douglas 55
V. C. Patterson & Associates 58
Pennsylvania Drilling Co. 59
Personalized Gifts 17
James G. Pierce & Assoc. 56
Pioneer Service & Engineering Co. 53
Pittsburgh Testing Laboratory 57
Praeger-Kavanagh 56
Robert and Company Associates 53
Russell and Axon 55
A. C. Sampietro 54
Sargent & Lundy 53
Victor O. Schinnerer & Co. 18
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Syska & Hennessy, Inc. 56
Sverdrup & Parcel, Inc. 55
Tippetts-Abbett-McCarthy-Stratton 56
Toledo Testing Laboratory 56
Vapor Heating Corp. 13
Emerson Venable 57
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Warren George 58
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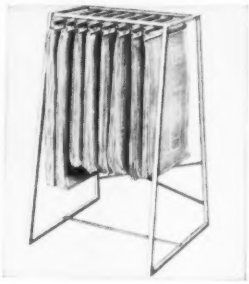

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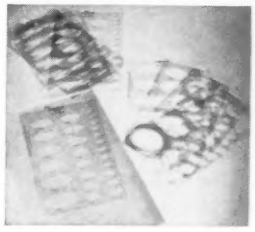

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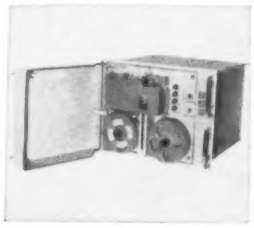
TAPE PERFORATOR — Item 36



Motorized military paper tape perforator in a unitized package providing smooth eccentric drive ideally suited for ground support applications, has been developed and manufactured by Data Instruments division of Telecomputing Corporation. It consists of a Telecomputing Corporation type 118A-5 tape perforator, drive motor, control switches, input relays, and indicators.

R — Item 33

a new precision capacity measuring instrunnounced by C. E. S. Electronic Products. The new instrument, known as C. E. S. Model 402D Micro-Miker, measures capacity from 0 to 1000 uuf in three ranges and inductance from 0 to 140 uh in one range. Accuracy is ±2% of the reading (typically ±1½%) for capacity and ±3% for inductance. The resolution is described as 0.1% of full scale. A stable zero and single 6-inch engraved dial are the only controls necessary for capacity and inductance measurements.

AIR CYLINDERS — Item 37

New one-inch-bore air cylinders designed especially for high-speed assembly machines and other heavy-duty applications in small space are announced by Hydro-Line Manufacturing Company. Designated Series B, the precision cylinders employ Teflon rod seal-wiper combinations and piston seals to help eliminate awkward maintenance under cramped quarters, and are rated at 200 psi. The rod seal-wiper combination and leakproof barrel seals can be removed without disassembling the cylinder. Barrel seals are supported radially by shoulders on barrel ends to insure proper seal compression.

This feature describes new products of general interest to professional engineers. For further information, circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

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